Systematic Review

Implementing Recommended Mental Health and Substance Use Screening and Counseling Interventions in Primary Care Settings for Children and Adolescents

Agency for Healthcare Research and Quality

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Preface

The Agency for Healthcare Research and Quality (AHRQ), through its Evidence-based Practice Centers (EPCs), sponsors the development of systematic reviews to assist public- and private-sector organizations in their efforts to improve the quality of healthcare in the United States. These reviews provide comprehensive, science-based information on common, costly medical conditions, and new healthcare technologies and strategies.

Systematic reviews are the building blocks underlying evidence-based practice; they focus attention on the strength and limits of evidence from research studies about the effectiveness and safety of a clinical intervention. In the context of developing recommendations for practice, systematic reviews can help clarify whether assertions about the value of the intervention are based on strong evidence from clinical studies. For more information about AHRQ EPC systematic reviews, see https://effectivehealthcare.ahrq.gov/about/epc/evidence-synthesis.

AHRQ expects that these systematic reviews will be helpful to health plans, providers, purchasers, government programs, and the healthcare system as a whole. Transparency and stakeholder input are essential to the Effective Health Care Program. Please visit the website (www.effectivehealthcare.ahrq.gov) to see draft research questions and reports or to join an email list to learn about new program products and opportunities for input.

If you have comments on this systematic review, they may be sent by mail to the Task Order Officer named below at: Agency for Healthcare Research and Quality, 5600 Fishers Lane, Rockville, MD 20857, or by email to epc@ahrq.hhs.gov.

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In designing the study questions, the EPC consulted several Key Informants who represent the end users of research. The EPC sought the Key Informant input on the priority areas for research and synthesis. Key Informants are not involved in the analysis of the evidence or the writing of the report. Therefore, in the end, study questions, design, methodological approaches, and/or conclusions do not necessarily represent the views of individual Key Informants.

Key Informants must disclose any financial conflicts of interest greater than $5,000 and any other relevant business or professional conflicts of interest. Because of their role as end users, individuals with potential conflicts may be retained. The TOO and the EPC work to balance, manage, or mitigate any conflicts of interest.

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Prior to publication of the final evidence report, EPCs sought input from independent Peer Reviewers without financial conflicts of interest. However, the conclusions and synthesis of the scientific literature presented in this report do not necessarily represent the views of individual reviewers. AHRQ may also seek comments from other Federal agencies when appropriate.

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Implementing Recommended Mental Health and Substance Use Screening and Counseling Interventions in Primary Care Settings for Children and Adolescents: A Systematic Review

Abstract

Objectives. To assess the impact of implementation strategies for mental health and substance use screening and counseling for children and adolescents in primary care as recommended by the United States Preventive Services Task Force and Bright Futures Periodicity Schedule.

Data sources. PubMed®, PsycInfo®, Cochrane Library, and the Cumulative Index to Nursing and Allied Health Literature®, as well as gray literature sources, reference lists, and technical experts.

Review methods. We followed the Agency for Healthcare Research and Quality Methods Guide for Effectiveness and Comparative Effectiveness Reviews, adapting it with classifications from the Expert Recommendations for Implementing Change (ERIC) and the Effective Practice and Organisation of Care (EPOC) taxonomies. We searched for studies published from January 1, 2010, through July 26, 2024, and selected studies that compared strategies for implementing mental health and substance use screening and counseling interventions for children and adolescents in primary care with another implementation strategy or no strategy. We evaluated randomized and nonrandomized controlled trials and interrupted time series studies. Studies conducted outside the United States were evaluated separately.

Results. We included 11 studies from the United States and 2 from other countries. Studies focused on screening and counseling for depression and suicide risk, eating disorders, substance use disorders, and general behavioral health risk factors. Implementation approaches were multifaceted and consisted of learning collaboratives, providing support to clinicians, adding new team members to incorporate behavioral health into primary care, and using technology. Overall, our confidence in the available evidence was limited, with numerous outcomes receiving a very low strength of evidence rating. When compared to clinical interventions where only minimal or no strategies were employed, the use of implementation strategies consistently resulted in higher screening rates and increased initiation of treatments. Few studies assessed patient outcomes, and clinician support neither reduced risk behaviors nor increased referrals for specialty substance use treatment. Different types of implementation approaches appeared to have comparable effectiveness. The evidence on the impact of implementation strategies on inequities in the delivery of recommended interventions for populations at risk for disparities was limited to a single study focused on clinician support for screening for depression and suicide risk, and yielded very low strength of evidence. We did not identify any studies on implementation of screening for anxiety or maternal depression among teenage mothers. Furthermore, none of the included studies assessed the acceptability or feasibility of the implementation approaches utilized, nor were patients' quality of life or adverse events assessed.

Conclusions. The identified implementation approaches may increase screening and brief interventions. The evidence, however, is uncertain. Different types of implementation strategies appear to have comparable effectiveness.

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Executive Summary

Main Points

- Few studies (n=11) meeting inclusion criteria evaluated strategies to implement clinical interventions recommended by the Bright Futures Periodicity Schedule and the U.S. Preventive Services Task Force (USPSTF) for preventing mental health and substance use disorders for use in primary care settings among children and adolescents.

- The implementation approaches identified in this report are complex, multifaceted approaches. We categorized studies as evaluating one of four overarching implementation approaches: incorporating behavioral health into primary care, engaging in learning collaboratives, providing support to clinicians, and using technology to facilitate screening or brief intervention. Studies were classified based on the primary implementation strategy employed, and in instances where multiple implementation approaches occurred, studies were categorized according to the most intensive implementation approach. Behavioral health incorporation was considered the most intensive, followed by learning collaboratives, providing support to clinicians, and finally, the use of technology.

- Implementation approaches consistently led to increased screening (reach) and a greater number of brief interventions and counseling for moderate-risk and high-risk behaviors (addressing a positive screen), and appropriate prescribing for mental health conditions (initiating treatment) compared with when no or minimal strategies were employed. Evidence assessing the impact of implementation approaches on patient outcomes was limited to clinician support, which did not improve risk behavior compared with educational material. Much of this evidence remains highly uncertain, with higher certainty for counseling than screening in some settings.

- Studies comparing different implementation approaches generally reported comparable effectiveness, though individual outcomes occasionally showed differences. The evidence on the impact of implementation strategies on inequities in the delivery of recommended interventions for populations at risk for disparities was limited to a single study focused on clinician support for screening for depression and suicide risk and yielded insufficient strength of evidence.

- No studies were identified that focused on the implementation of screening for anxiety, screening for social/emotional well-being of young children, or maternal depression among teenage mothers. Additionally, the 11 included studies failed to assess the acceptability or feasibility of the clinical intervention being implemented. Assessments of patients' quality of life or adverse events were also absent. Furthermore, evidence was lacking on whether characteristics of the population, settings, care delivery, or the implementation strategy itself influences the effectiveness of implementation strategies.

- Despite the increase in screening and counseling that resulted from implementation approaches, the combination of limited evidence and lack of certainty about the available evidence highlights the need for more research on the impact of strategies to implement

recommended screening and counseling interventions to prevent mental health disorders in primary care settings for children and adolescents.

Background and Purpose

In the United States, nearly 25 percent of children are affected by mental health or substance use disorders.[1] This prevalence is disproportionally greater among disadvantaged groups, such as children and adolescents of color; from low-income households; or who have disabilities.[2-5] Screening and counseling for mental health disorders among children and adolescents is recommended by the American Academy of Pediatrics Bright Futures Periodicity Schedule and the USPSTF. However, there is a gap in successfully implementing evidence-based preventive mental health interventions into primary care due to myriad barriers such as limitations in providers' attitudes and knowledge of interventions, limited time and resources for the increased workload required to screen and counsel, mental health provider shortages, or limited or uncertain reimbursement for services. This review aims to assess the effectiveness and risk for harms of implementation strategies—techniques that enhance implementation, service, and health outcomes[6]—for mental health and substance use screening and counseling for children and adolescents in primary care as recommended by the USPSTF and Bright Futures Periodicity Schedule.

Methods

This systematic review follows the Agency for Healthcare Research and Quality Methods Guide for Effectiveness and Comparative Effectiveness Reviews, which is adapted with classifications from the Expert Recommendations for Implementing Change (ERIC)[7] and the Effective Practice and Organisation of Care (EPOC)[8, 9] taxonomies. The review process involved collaboration with Key Informants and a Technical Expert Panel to refine the scope and protocol and to prioritize outcomes most important for decision making. We searched multiple electronic databases and gray literature sources from January 1, 2010, through July 26, 2024. Two investigators independently screened each abstract and full text and rated the risk of bias of included studies. During abstract screening, we used DistillerSR's artificial intelligence (AI) capabilities to continually prioritize abstracts with a high likelihood of meeting inclusion criteria. For the bottom 30 percent of prioritized abstracts, DistillerSR's AI function replaced one investigator for screening. We abstracted data on characteristics of study populations, settings, clinical interventions, potential barriers and facilitators to implementation, implementation strategies, comparators, study designs, methods, and results from included studies. We rated the strength of evidence using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group approach.[10]

Results

We included 11 studies (3 randomized controlled trials [RCTs],[11-13] 2 cluster RCTs,[14, 15] 1 stepped-wedge trial,[16] 4 nonrandomized controlled trials,[17-20] and 1 interrupted time series [ITS]).[21] Studies allocated a range of 163 to 8,108 participants, 22 to 354 providers, and 4 to 59 practices. Clinical interventions of included studies focused on screening and brief intervention for depression and suicide risk,[19-21] eating disorders,[18] substance use,[13-15] and general behavioral health risk factors.[11, 12, 16, 17] Four studies implemented screening only,[17-20] three studies utilized

screening and brief intervention, and four employed screening, brief intervention, and referral to treatment (SBIRT)[14-16, 21] as clinical interventions.[11-13]

The overarching implementation approaches that studies evaluated consisted of learning collaboratives,[18, 19, 21] providing clinician support,[11-13, 15, 20] adding new team members to incorporate behavioral health into primary care,[14-16] and using technology to facilitate screening or brief intervention.[17] These approaches were multifaceted with studies often using multiple implementation strategies. These complex approaches to implementation were compared with no strategy,[15-17, 19-21] a minimal implementation strategy (distributing information/educational material),[11, 12, 18] or some other set of implementation strategies.[13-15]

More than half of the included studies (6 of 11) were rated as having high risk of bias, mostly because of uncontrolled potential confounding.[16-21] **Table A** summarizes the effects of implementation approaches on implementation, service, and patient outcomes[6] for different clinical interventions.

Overall, our confidence in the available evidence was limited, with numerous outcomes receiving a very low strength of evidence rating because of methodological study limitations or the small number of patients who screened positive. That being said, there was evidence of moderate to high strength in the studies that evaluated strategies for improving screening and counseling for substance use.

Findings of low or very low evidence suggest that compared with minimal or no implementation, various approaches led to improved rates of screening, responses to positive screens, and initiation of treatment. Specifically, engaging in learning collaboratives increased screening rates for depression and eating disorders.[18, 19, 21] Clinician support resulted in higher depression screening rates and more frequent brief interventions for depression.[20] Support for clinicians to implement general behavioral health screening also led to higher rates of counseling for moderate- and high-risk behaviors (e.g., for alcohol and drug use, depression).[11, 12] Incorporating behavioral health into primary care settings enhanced screening for general behavioral health risks and facilitated treatment initiation.[16] Leveraging technology to screen patients electronically and aggregate responses into an online report to guide providers during patient encounters increased screening for risky behavior and mental health concerns.[17] Only one study assessing clinician support, however, reported on patient outcomes. Based on evidence of high and moderate strength, clinician support did not reduce risk behaviors despite an increase in counseling compared with the distribution of educational materials.[11, 12]

Studies comparing different types of implementation approaches reported comparable effectiveness with occasional exceptions in individual outcomes. Evidence of high or moderate strength demonstrated that clinician support and behavioral health incorporation had comparable effectiveness in enhancing screening and brief advice.[14] Brief interventions for substance use, however, were utilized more frequently with clinician support than behavioral health incorporation.[14] Evidence of moderate strength found comparable time to first post-visit use of alcohol and cannabis when employing clinician support with computer-based reminders as an implementation strategy versus technology without reminders for low-risk youth.[13] There was low strength of evidence that providers in the clinician support with reminders arm delivered brief advice and provided information on health risks of alcohol and cannabis use more often than providers in the technology support without reminders arm. Strength of evidence was moderate for increased time to alcohol or cannabis use among youth at increased risk of alcohol and substance use when delivered with clinician support and reminders compared to technology without reminders.[13]

Although the addition of behavioral health incorporation to clinician support did not result in increased screening, it increased the frequency of brief interventions while it simultaneously reduced referrals to specialty treatment.[15] These findings are based on high strength of evidence for screening, moderate strength of evidence for brief intervention, and low strength of evidence for referral to specialty treatment.

Only one study examined the impact of an implementation strategy on equity, finding that clinician support increased screening without exacerbating inequity among disadvantaged patients based on race and ethnicity.[20]

We did not identify any studies on implementation of screening for anxiety or maternal depression among teenage mothers. Furthermore, none of the included studies assessed the acceptability or feasibility of the implementation approaches used nor were patients' quality of life or adverse events assessed.

Table A. Summary of effects of implementation strategies

Clinical Intervention	**Implementation Strategy (Clinical Intervention) Versus Comparator**	**Implementation Outcomes**	**Service Outcomes**	**Patient Outcomes**
Screening and Brief Intervention for Depression and Suicide Risk	Learning collaborative (screening or SBIRT) vs. no strategy	**Acceptability:** No evidence **Feasibility:** No evidence **Reach:** k=2[19, 21] • A learning collaborative may increase screening, but the evidence is very uncertain (very low SOE). **Sustainability**: k=2[19, 21] • A learning collaborative may lead to a sustainable increase of screening, but the evidence is very uncertain (very low SOE).	**Equity:** No evidence **Address positive screen:** k=1[19] • A learning collaborative may have little to no effect on the provision of an initial plan of care for patients screening positive, but the evidence is very uncertain (very low SOE). **Initiation of treatment:** No evidence	**Mental health:** No evidence **Quality of life:** No evidence **Adverse events:** No evidence
	Support clinicians (screening) vs. no strategy	**Acceptability:** No evidence **Feasibility**: No evidence **Reach**: k=1[20] • Providing support to clinicians may increase screening, but the evidence is very uncertain (very low SOE). **Sustainability:** No evidence	**Equity:** k=1[20] • Providing support to clinicians may have little to no effect on inequity, but the evidence is very uncertain (very low SOE). **Address positive screen:** No evidence **Initiation of treatment:** No evidence	**Mental health:** No evidence **Quality of life:** No evidence **Adverse events:** No evidence
Screening for Eating Disorders	Learning collaborative (screening) vs. distribute educational materials only	**Acceptability:** No evidence **Feasibility:** No evidence **Reach:** k=1[18] • A learning collaborative may increase screening, but the evidence is very uncertain (very low SOE). • A learning collaborative may increase screening in high-risk patients, but the evidence is very uncertain (very low SOE). **Sustainability:** No evidence	**Equity:** No evidence **Address positive screen:** No evidence **Initiation of treatment:** No evidence	**Mental health:** No evidence **Quality of life:** No evidence **Adverse events:** No evidence

Clinical Intervention	**Implementation Strategy (Clinical Intervention) Versus Comparator**	**Implementation Outcomes**	**Service Outcomes**	**Patient Outcomes**
Screening and Counseling for Alcohol, Tobacco, and Other Substance Use	Behavioral health Incorporation (SBIRT) vs. clinician support only	**Acceptability:** No evidence **Feasibility:** No evidence **Reach:** k=1[14] <u>Screening</u> • Behavioral health incorporation and clinician support have comparable effectiveness in increasing screening (high SOE). **Sustainability:** k=1[14] <u>Screening</u> • Behavioral health incorporation and clinician support have comparable effectiveness in sustaining screening (high SOE). <u>Brief advice</u> • Behavioral health incorporation and clinician support may have comparable effectiveness in sustaining provision of brief advice (low SOE). <u>Brief intervention</u> • Behavioral incorporation may result in less sustained provision of brief interventions than clinician support (low SOE).	**Equity:** No evidence **Address positive screen:** k=1[14] <u>Brief advice</u> • Behavioral health incorporation and clinician support may have comparable effectiveness in increasing the provision of brief advice (low SOE). <u>Brief intervention</u> • Behavioral incorporation may be less effective in increasing the provision of brief interventions than clinician support (low SOE). **Initiation of treatment:** No evidence	**Mental health:** No evidence **Quality of life:** No evidence **Adverse events:** No evidence

Clinical Intervention	**Implementation Strategy (Clinical Intervention) Versus Comparator**	**Implementation Outcomes**	**Service Outcomes**	**Patient Outcomes**
Screening and Counseling for Alcohol, Tobacco, and Other Substance Use (continued)	Incorporation via an embedded BHCP plus clinician support (SBIRT) vs. clinician support only	**Acceptability:** No evidence **Feasibility:** No evidence **Reach:** k=1[15] <u>Screening</u> • Behavioral health incorporation when added to clinician support does not improve screening (high SOE). **Sustainability:** No evidence	**Equity:** No evidence **Address positive screen:** k=1[15] <u>Brief intervention</u> • Behavioral health incorporation when added to clinician support probably increases the provision of brief interventions (moderate SOE). <u>Referral to specialty treatment</u> • Behavioral health incorporation via an embedded BHCP probably reduces referrals to specialty treatment (low SOE). **Initiation of treatment:** No evidence	**Mental health:** No evidence **Quality of life:** No evidence **Adverse events:** No evidence
	Clinician support (SBIRT) vs. no strategy	**Acceptability:** No evidence **Feasibility:** No evidence **Reach:** No evidence **Sustainability:** No evidence	**Equity:** No evidence **Address positive screen:** k=1[15] <u>Brief intervention</u> • Clinician support likely increases the provision of brief interventions (moderate SOE). <u>Referral to specialty treatment</u> • Clinician support may have little to no impact on referrals to specialty treatment (low SOE). **Initiation of treatment:** No evidence	**Mental health:** No evidence **Quality of life:** No evidence **Adverse events:** No evidence

Screening and Counseling for Alcohol, Tobacco, and Other Substance Use (continued)	Clinician support including computer-based reminders (SBI) vs. technology without reminders	**Acceptability:** No evidence **Feasibility:** No evidence **Reach:** No evidence **Sustainability:** No evidence	**Equity:** No evidence **Address positive screen:** k=1[13] Brief advice: k=1[13] • Support for clinicians with computer-based reminders likely improves delivery of brief advice for alcohol use and cannabis use among high-risk adolescents (moderate SOE). • Support for clinicians with computer-based reminders likely improves delivery of information about health risks of alcohol use and cannabis use among high-risk adolescents (moderate SOE). **Initiation of treatment:** No evidence	**Mental health**: k=1[13] Alcohol use • Support for clinicians with computer-based reminders likely increases the time to first post-visit alcohol use among high-risk adolescents (moderate SOE). • Support for clinicians with computer-based reminders probably has little to no effect on time to post-visit alcohol use among low-risk adolescents (moderate SOE). Heavy episodic drinking • Support for clinicians with computer-based reminders probably has little to no effect on the time to first post-visit heavy episodic drinking among high-risk adolescents (moderate SOE). Cannabis use • Support for clinicians with computer-based reminders is likely to increase the time to first cannabis use among high-risk adolescents (moderate SOE). • Support for clinicians with computer-based reminders probably has little to no effect on time to first cannabis use among low-risk

Clinical Intervention	**Implementation Strategy (Clinical Intervention) Versus Comparator**	**Implementation Outcomes**	**Service Outcomes**	**Patient Outcomes**
				adolescents (moderate SOE). **Quality of life:** No evidence **Adverse events:** No evidence
Screening and Counseling for Alcohol, Tobacco, and Other Substance Use (continued)				
General Behavioral Health Risk Factors	Technology-based implementation approach (SBI) vs. no strategy	**Acceptability:** No evidence **Feasibility:** No evidence **Reach:** k=1[17] • A technology-based implementation approach may increase screening and brief intervention for risky behaviors, but the evidence is very uncertain. (very low SOE). • A technology-based implementation approach may increase screening and brief intervention for mental health concerns, but the evidence is very uncertain (very low SOE). **Sustainability:** No evidence	**Equity:** No evidence **Address positive screen:** No evidence **Initiation of treatment:** No evidence	**Mental health:** No evidence **Quality of life:** No evidence **Adverse events:** No evidence

Clinical Intervention	**Implementation Strategy (Clinical Intervention) Versus Comparator**	**Implementation Outcomes**	**Service Outcomes**	**Patient Outcomes**
General Behavioral Health Risk Factors (continued)	Clinician support-based implementation approach (SBI) vs. distribute educational materials only	**Acceptability:** No evidence **Feasibility:** No evidence **Reach:** No evidence **Sustainability:** No evidence	**Equity:** No evidence **Address positive screen:** k=2[11, 12] • A clinician support-based implementation approach is likely to increase counseling for moderate-risk behaviors (high SOE) • A clinician support-based implementation approach is likely to increase counseling for high-risk behaviors (high SOE) **Initiation of treatment:** No evidence	**Mental health:** k=2[11, 12] • A clinician support-based implementation approach has little to no effect on risk behaviors at 3-month followup (high SOE). • A clinician support-based implementation approach probably has little to no effect on risk behaviors at 6-month followup (moderate SOE). **Quality of life:** No evidence **Adverse events:** No evidence

Clinical Intervention	**Implementation Strategy (Clinical Intervention) Versus Comparator**	**Implementation Outcomes**	**Service Outcomes**	**Patient Outcomes**
General Behavioral Health Risk Factors (continued)	Incorporation-based implementation approach, with learning collaborative (SBIRT) vs. no strategy	**Acceptability:** No evidence **Feasibility:** No evidence **Reach:** k=1[16] • A combined incorporation and learning collaborative implementation approach may increase screening rates, but the evidence is very uncertain (very low SOE). **Sustainability:** No evidence	**Equity:** No evidence **Address positive screen:** k=1[16] • A combined incorporation and learning collaborative implementation approach may increase followup via primary care behavioral health visits, but the evidence is very uncertain (very low SOE). **Initiation of treatment:** k=1[16]) • A combined incorporation and learning collaborative implementation approach may increase psychotherapy visits with a specialist, but the evidence is uncertain (low SOE). • A combined incorporation and learning collaborative implementation may have little to no effect on increase in guideline-congruent ADHD prescribing, but the evidence is very uncertain (very low SOE). • A combined incorporation and learning collaborative implementation approach may increase guideline-congruent SSRI prescribing, but the evidence is very uncertain (very low SOE).	**Mental health:** No evidence **Quality of life:** No evidence **Adverse events:** No evidence

ADHD = attention deficit hyperactivity disorder; BHCP = behavioral healthcare practitioner; SBI = screening and brief intervention; SBIRT = screening, brief intervention, and referral to treatment; SOE = strength of evidence; SSRI = selective serotonin reuptake inhibitors.

Limitations

The evidence assessing the effectiveness of implementation strategies is limited in quality and quantity. More than half of the included studies exhibited high risk of bias and many outcomes were rated as very low strength of evidence, indicating that clear conclusions cannot be drawn. The evidence on patient outcomes and inequity in the delivery of recommended interventions for populations at risk for disparities was particularly limited.

By its nature, implementation science work poses great challenges because it involves multifaceted strategies and wide arrays of outcomes that require significant application of judgment when being synthesized. None of the studies evaluated the burden imposed on clinicians, which could vary significantly among different implementation strategies and could be the determining factor of whether the effectiveness of implementation strategies is sustainable over time.

Studies with simple pre-post comparisons or statistical process control charts without an interrupted time series design were excluded, so many quality improvement studies were not considered in this report. Although the inclusion of such studies would have resulted in a greater volume of evidence, the lack of a control group in pre-post studies limits the quality of the evidence and the ability to draw conclusions. Thus, the addition of such papers to the review would have still resulted in low or very low strength of evidence. It is noteworthy that studies using statistical process control charts have found an increase in screening,[22-24] which was also suggested in the studies included in this report. So, although it is not possible to draw definitive causal conclusions from the studies included in this report, both the studies that were included and not included suggest a positive direction worthy of future research. Clinicians looking for ways to get started in addressing mental health and substance use disorders could consider using this available evidence for guidance while waiting for further research.

Implications and Conclusions

The identified implementation approaches may improve some aspects of addressing mental health and substance use disorders in primary care, particularly in increasing screening and brief interventions. The evidence, however, is uncertain. Different types of implementation strategies appear to have comparable effectiveness with occasional exceptions in individual outcomes.

However, it is not currently possible to draw definitive conclusions. This is due to lack of data for certain conditions addressed in the USPSTF and Bright Futures guidelines, missing data for certain outcomes (particularly equity and health outcomes), and many areas of low or very low strength of evidence. Decision makers initiating implementation strategies to enhance mental health and substance use screening and counseling in children and adolescents should prioritize strategies backed by available evidence, even in cases where certainty is limited. Future studies need to address a broader array of age groups and outcomes, including sustainability and clinician burden. These trials would assess the comparative effectiveness of various strategies as well as their general effectiveness when compared to no specific implementation strategy. Because of the significant workload for primary care clinics to add screening and counseling for mental health and substance use disorders to their workflow, it is important to ensure that the implementation results in better health for patients and not just increased work for primary care clinicians.

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1. Introduction

1.1 Background

Mental health and substance use disorders are common among children and adolescents in the United States, with nearly 20 percent experiencing a mental health disorder in a given year.[1] The prevalence of some mental health disorders among children and adolescents is increasing;[2-4] for example, the number of children and adolescents diagnosed with anxiety and depression grew by nearly 30 percent each between 2016 and 2020.[5] This trend was further exacerbated during the COVID-19 public health emergency.[5-8] For example, mental health–related emergency department visits increased 24 percent for children ages 5 to 11 years and 31 percent for those ages 12 to 17 years from March 2020 to October 2020 compared with 2019 emergency department visits.[7] Moreover, the burden of mental health disorders is not equitably distributed. Children and adolescents of color; from low-income households; who have disabilities; or who have a combination of these factors[9-11] face a disproportionately higher burden of these disorders.[12]

Untreated or poorly managed mental health disorders among children and adolescents have significant consequences, including reduced long-term quality of life[13] and higher mortality.[14] However, despite the high prevalence and the negative impacts of these disorders, nearly half of children and adolescents with mental health disorders do not receive any treatment (40.2%), and nearly half (41.5%) perceived an unmet need for mental health services in 2023.[15-18] Between 2010 and 2021, approximately 60% of youth who died by suicide had no mental health diagnosis, underscoring the significant unidentified and unmet mental health needs.[19]

Primary care settings, traditionally focused on prevention and family-centered care, offer an opportunity to intervene by using preventive mental health interventions ranging in scope from brief risk assessments or symptom screenings to more in-depth counseling to avoid the progression of the condition. There has been a growing emphasis to increase investment in prevention of mental health disorders in these settings, including the Patient Protection and Affordable Care Act and the Mental Health Parity and Addiction Equity Act, which have expanded access to preventive and other mental health services.[20, 21] Furthermore, although mental health services have often been isolated from primary care, leading to fragmented and uncoordinated care in the past, there is now a shift toward incorporating physical and behavioral mental healthcare in the primary care setting.[22]

1.1.1 Current Guidance for Implementing Preventive Mental Health Interventions for Children and Adolescents

The American Academy of Pediatrics, through its Bright Futures initiative,[23] and the U.S. Preventive Services Task Force (USPSTF)[24] are two groups that make recommendations about which preventive services should be offered in primary care settings. The Bright Futures Periodicity Schedule[25] and the USPSTF recommend screening and counseling for mental health disorders, including substance use disorders, among children and adolescents. Identification through screening and early management may increase access to appropriate services, increase positive behaviors, minimize the severity and progression of illness, and ultimately improve health and quality of life outcomes for children and adolescents.[26, 27] For instance, screening for a particular mental health disorder among children and (e.g., depression) can serve as a preventive

measure for a second condition (e.g., substance use disorder) and decrease the potential long-term outcomes associated with untreated mental illness (e.g., risk of school dropout and juvenile justice system involvement).[28, 29] Unfortunately, there has been limited implementation of evidence-based preventive mental health interventions in primary care[30] due to myriad barriers such as limitations in primary care providers' attitudes and knowledge of interventions and ability to address mental health during the primary care visit, limited time and resources to compensate for the increased workload, poorly defined incorporated staff roles, inadequate coordination between physical and mental health providers, lack of mental health providers, and limited or uncertain reimbursement for services.[31]

1.1.2 Implementation Strategies as a Way To Increase Evidence-Based Screening and Counseling for Mental Health Disorders

Implementation science, defined as the study of methods to promote the systematic adoption of research findings and other evidence-based practices into routine practice,[32] is well-positioned to address this significant research-to-practice gap. Implementation strategies, which are methods or techniques used to enhance implementation outcomes such as adoption, reach, and sustainability, offer a pathway to improve the implementation of preventive mental health interventions into practice.[33] Moreover, implementation strategies also have the potential to address the inequitable burden of mental health disorders across different disadvantaged groups of children and adolescents. By centering health equity within the design, selection, and application of implementation strategies, they can be harnessed and adapted to improve the equitable uptake of recommended preventive mental health interventions. However, deciphering which strategies are appropriate for a given implementation goal and the ways in which they need to be tailored for primary care settings is not easily determined based on the range of possible strategies and the settings in which they have been tested. Consequently, it is still necessary to identify and understand which implementation strategies are effective in implementing recommended preventive mental health interventions into primary care.

Implementation strategies should ideally be selected and tailored to specific populations, settings, or determinants (i.e., barriers and facilitators[34]) to increase the likelihood of successful implementation. For example, implementing screenings in school-based mental health settings may require adapted or entirely different strategies[35] than when implementing them in traditional primary care settings, as each setting has its own unique challenges and contextual considerations.[36] Some implementation strategies can be classified as discrete implementation strategies, which are single techniques such as distributing educational materials, implementing reminders to prompt screening or counseling, or creating a new clinical team.[37] However, given that implementation is inherently multilevel (e.g., occurring across patients, caregivers, providers, or practices), implementation strategies are more often multifaceted, which combines multiple discrete strategies to improve implementation outcomes across levels (e.g., feasibility at the practice level and fidelity at the provider level) to ultimately improve health outcomes for children and adolescents.[37]

1.2 Purpose and Scope of the Systematic Review

This systematic review was commissioned in response to a renewed focus and investment from the Federal Government to address the youth mental health crisis. Although there is some evidence on the effectiveness of different preventive mental health interventions,[38] there is

limited guidance for implementing preventive mental health interventions in primary care settings to reproduce successful implementation in practice. This systematic review assessed implementation strategies for recommended mental health and substance use screening and counseling interventions for children and adolescents in primary care.

2. Methods

2.1 Review Approach

Our methods followed the Agency for Healthcare Research and Quality (AHRQ) Methods Guide for Effectiveness and Comparative Effectiveness Reviews. Because no specific guidance for reviews on implementation strategies is available, we adapted the guidance by employing classifications for interventions and comparators as outlined by the Expert Recommendations for Implementing Change (ERIC)[39] and the Effective Practice and Organisation of Care (EPOC) taxonomy.[40, 41] Our reporting adheres to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guideline[42] and the extensions for reporting complex interventions[43] and equity.[44] To determine study designs of nonrandomized studies, we used criteria proposed by AHRQ for the classification of study designs.[45]

To refine the scope of the review and the protocol, we worked with Key Informants (KIs) and a Technical Expert Panel (TEP). The seven KIs consisted of mental health clinicians and researchers, patient and family advocates, and payers and policymakers. An important task of the KIs was to select outcomes that are relevant to assess the effectiveness of implementation strategies, as well as other outcomes that are important for children, adolescents, and their families. A search in the Core Outcome Measures in Effectiveness Trials (COMET) database did not find relevant core outcome sets for this topic. The TEP consisted of a distinguished group of seven implementation scientists and clinicians with experience in preventive mental healthcare for children and adolescents. Some TEP members also had expertise in equity and evidence synthesis. TEP members participated in a conference call and discussions through email to review the logic model, Key Questions (KQs), and PICOTS (population, interventions, comparators, outcomes, timing, and setting).

The final protocol was posted on AHRQ's Effective Health Care website from December 8, 2023, to January 5, 2024. We posted a Supplemental Evidence and Data for Systematic Reviews (SEADS) notice on the Effective Health Care Program website for 4 weeks to receive supplemental evidence and data from the public. The protocol was registered with PROSPERO (CRD42024499342). Additional details on methods are reported in Appendix A.

2.1.1 Key Questions

This review included one KQ:

KQ 1. What is the impact of strategies to implement recommended screening and counseling interventions to prevent mental health and substance use disorders in primary care settings for children and adolescents?

a. Do the characteristics of the population, settings, care delivery, or implementation strategy lead to varying impacts in different population subgroups?
b. Can implementation strategies improve equity in the delivery of recommended interventions to prevent mental health disorders for populations at risk for disparities (e.g., those of minority

race, ethnicity, and those with physical disabilities and low socioeconomic status)?

To assess the potential applicability of studies conducted outside the United States, we summarized non-U.S. studies captured by our literature search that meet other inclusion criteria using a Contextual Question (CQ):

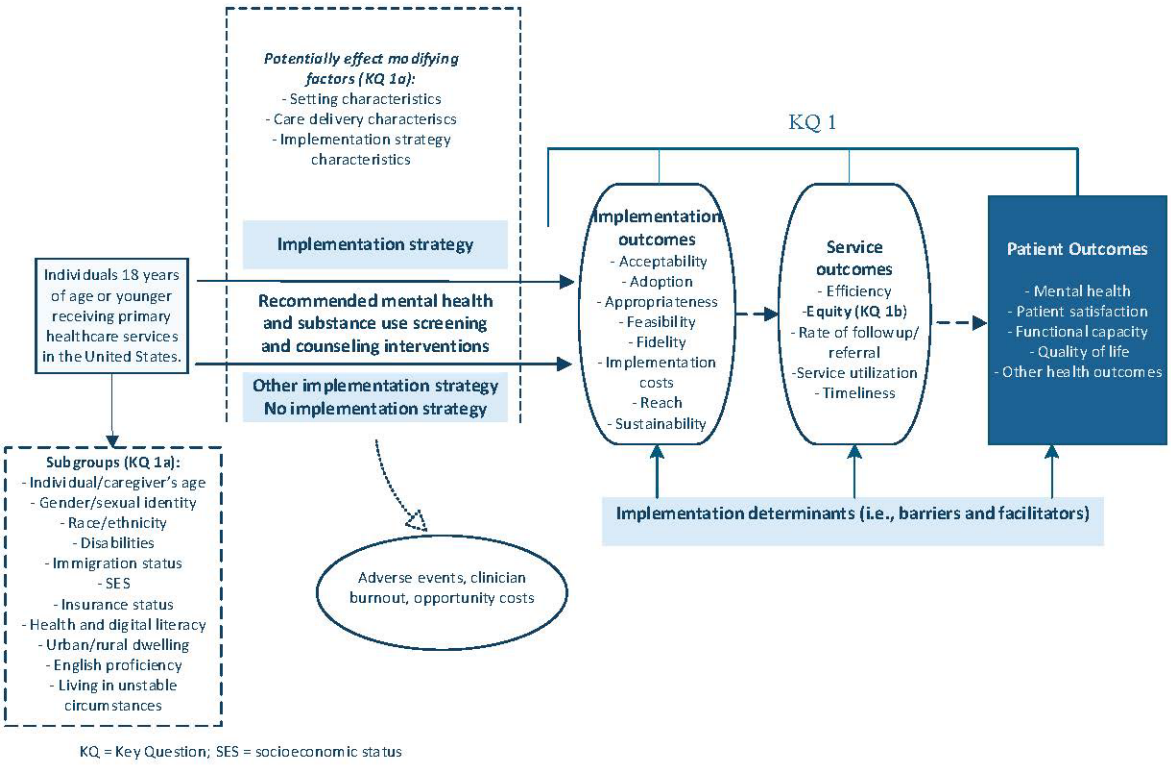
CQ 1. What strategies for implementing interventions to prevent mental health disorders (including substance use disorders) in primary care settings for children and adolescents were examined in seminal studies conducted outside the United States?

a. What are the findings of these seminal studies?

2.1.2 Logic Model

We developed a logic model to guide the systematic review process (**Figure 1**). As shown in Figure 1, we categorized our outcomes of interest as implementation, service, and patient outcomes.[46] Implementation outcomes were defined as the effects of implementing primary care mental health and substance use screening and counseling interventions, measured by acceptability, adoption, appropriateness, feasibility, fidelity, implementation costs, reach, and sustainability. Service outcomes were defined as the extent to which services are efficient, equitable, effective, or timely.[46] Patient outcomes were defined as the impact on the patient and measured by patient mental health, patient satisfaction, functional capacity, quality of life, or any other reported health outcomes.

Figure 1. Logic model



KQ = Key Question; SES = socioeconomic status

2.2 Study Selection

2.2.1 Inclusion and Exclusion Criteria

We developed inclusion and exclusion criteria with respect to PICOTS for the KQ. They are listed in detail in Appendix A, **Table A-5**. Briefly, our population of interest was individuals 18 years of age or younger receiving primary healthcare services (we also included studies with a mix of patients both younger than and older than 18 years of age if at least 80 percent of the population was younger than 21 years of age). We focused on clinical interventions that are recommended in the Bright Futures Periodicity Schedule, developed by the American Academy of Pediatrics, and by the U.S. Preventive Services Task Force (USPSTF) to prevent mental health disorders (including interventions with insufficient evidence). We used the Bright Futures Periodicity Schedule and the USPSTF recommendations because, together, they provide a comprehensive, evidence-based framework for mental health preventive interventions in children and adolescents in the United States.

The eligible interventions encompassed all strategies aimed at implementing clinical interventions designed to prevent mental health disorders. We classified implementation strategies using the ERIC[39] and the EPOC taxonomy.[40, 41] Comparators were other implementation strategies or no implementation strategies.

We categorized our other outcomes of interest as implementation, service, and patient outcomes.[46] Eligible study designs included randomized controlled trials (RCTs), nonrandomized controlled trials, and interrupted time series. We excluded uncontrolled studies such as pre-post studies, which cannot adequately control for time trends.

2.2.2 Search Strategy

To identify articles relevant to the KQ and CQ, we conducted a focused PubMed®/MEDLINE® search for studies published from January 1, 2010, through July 26, 2024, by using a variety of terms, including Medical Subject Headings (MeSH) and related keywords and phrases, and by limiting the search to English-language studies, studies involving children and adolescents (18 years of age or younger), and human-only studies. We selected 2010 as the starting date for the literature searches because implementation strategies for preventive behavioral and mental health services have evolved significantly since the passage of the Patient Protection and Affordable Care Act.[20, 21] We also searched the American Psychiatric Association (APA) PsycInfo®, the Cochrane Library, the Cumulative Index to Nursing and Allied Health Literature®, and Embase® (for primary studies only) using analogous search terms. The PubMed search strategy was peer reviewed by another Evidence-based Practice Center librarian. For the PubMed search, we removed studies conducted in low- and middle-income countries with the validated National Institute for Health and Care Excellence Organisation for Economic Co-operation and Development countries geographic search filter.[47] We focused the search on high-income countries because of their greater applicability to the U.S. healthcare system.

Additionally, we searched the gray literature for unpublished studies relevant to this review. Gray literature sources included ClinicalTrials.gov, Greynet.org, the Trip Medical Database, Google Advanced Search, and the literature collection on AHRQ's Academy for Integrating Behavioral Health and Primary Care website.

To avoid retrieval bias, we conducted supplementary searches in reference lists of landmark studies and relevant reviews, editorials, and commentaries on this topic to look for any relevant citations that might have been missed by electronic searches.

Appendix A provides a detailed explanation of the search strategy, including the search strings for all databases.

2.2.3 Literature Screening

We used DistillerSR for literature screening, leveraging its artificial intelligence (AI) capabilities to continually prioritize abstracts with a high likelihood of meeting our inclusion criteria. Two investigators independently screened the top 70 percent of these prioritized abstracts against predefined inclusion and exclusion criteria. For the remaining 30 percent of abstracts, we substituted one investigator with DistillerSR's AI function that had been trained based on the investigator's selections of the dual-screening abstracts. Any discrepancies between human investigators and DistillerSR were resolved through review by an additional investigator. We also employed DistillerSR's AI function to check for screening errors to vet dual exclusions of abstracts. Studies marked for possible inclusion underwent a full-text review. For studies without adequate information to determine inclusion or exclusion, we retrieved the full text. All results were tracked in DistillerSR.

Two trained team members independently reviewed each full-text article for inclusion or exclusion based on the eligibility criteria. If both reviewers agreed that a study did not meet the eligibility criteria, the study was excluded. Conflicts in decisions were resolved by discussion and consensus or by consulting a third member of the review team. We recorded the reasons for exclusions of full-text publications.

2.3 Data Extraction

We extracted data using DistillerSR and organized relevant information, including characteristics of study populations, settings, clinical interventions, potential barriers and facilitators to their implementation, implementation strategies, comparators, study designs, methods, and results, into evidence tables.

To provide users of our review with the necessary information to determine the applicability of findings, we extracted detailed data on contexts,[48] settings, interventions,[48] and implementation strategies. We used Proctor et al.'s recommendations for specifying implementation strategies[33] to guide our data abstraction and reporting so that end users of the review can operationalize the strategies in practice and replicate their effectiveness.

Further details on the data extraction process are available in **Appendix A**.

2.4 Risk of Bias Assessment

To assess risk of bias, we used the Cochrane Risk of Bias 2 (RoB 2.0) tool for individually randomized parallel-group trials,[49] the RoB 2 extension for cluster-randomized parallel-group trials (RoB 2 CRT),[49] the Risk Of Bias In Non-randomized Studies of Interventions (ROBINS-I) tool[50] for nonrandomized studies of interventions with concurrent controls, and the Effective Public Health Practice Project tool[51] for interrupted time series analysis. Two reviewers independently assessed the risk of bias at the study and outcomes level. They resolved discrepancies by consensus or by involvement of a third, senior investigator.

At the outset of rating the risk of bias, we specified the effect of adherence as our primary perspective of interest, focusing on the impact of adhering to an implementation strategy, rather than solely considering the effect of assignment to such a strategy. We adopted this perspective because we recognize that failures in implementing an implementation strategy and nonadherence can significantly influence the outcomes of clinical preventive interventions that have already demonstrated their effectiveness.

Because the risk of bias tools that we employed used different terminologies for different risk of bias categories, we harmonized the terminologies for our report. Specifically, we collapsed ROBINS-I ratings of *serious* and *critical* risk of bias into one category and refer to it as *high risk of bias* to be consistent with the RoB 2 tool. In addition, we changed ROBINS-I ratings of *moderate* risk of bias and Effective Public Health Practice Project tool ratings of *unclear* risk of bias to *some risk of bias concerns.* We use the RoB 2 classification of risk of bias ratings*: low risk of bias, some risk of bias concerns,* and *high risk of bias.* **Appendix A** presents the definitions of the risk of bias categories.

2.5 Data Synthesis and Analysis

We summarized data narratively, structuring the synthesis of the evidence by clinical interventions and following the Cochrane EPOC[40, 41] and the ERIC[39] frameworks. An implementation scientist merged the ERIC[39] and EPOC[40, 41] frameworks into a single comprehensive framework, combining similar strategies across the two frameworks where appropriate (Appendix A, **Table A-7**). Two implementation scientists independently coded implementation strategies and overarching implementation approaches reported in each included study according to the adapted framework and resolved disagreements through adjudication. As the overarching implementation approaches were multifaceted with studies often utilizing multiple implementation strategies, studies were classified based on the primary implementation strategy employed.

If we found three or more similar RCTs addressing an outcome of interest, we considered meta-analysis of the data from those studies. When only two similar RCTs were identified for meta-analysis, we considered fixed effects models to estimate pooled effects.[52] To determine whether quantitative analyses were appropriate, we assessed the contextual, clinical, and methodological heterogeneity of the studies under consideration following established guidance.[53] We assessed statistical heterogeneity in effects between studies by calculating the chi-squared statistic and the I^2 statistic (the proportion of variation in study estimates attributable to heterogeneity).[54, 55] We initially planned to assess publication bias through funnel plots and Egger's test. However, due to the limited number of studies, a formal assessment of publication bias was not feasible.

To leverage the expected heterogeneity, we intended to use Qualitative Comparative Analysis (QCA)[56] to identify potential relationships between implementation strategies and the desired outcomes. Because of few studies, we were not able to conduct QCA.

2.6 Grading the Strength of the Body of Evidence

We rated the strength of evidence (SOE) based on the guidance established by the Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group.[57] We asked the TEP to rate the relative importance of outcomes using a modified Delphi approach. Panel members rated the importance of outcomes on a Likert scale from 1 to 9, where 1 is the least important and 9 the most important for decision making. Appendix A, **Table A-8** presents

results of the ratings for each of the three categories. We rated the SOE for the three outcomes with the highest mean rating from each outcome type, which included equity, address a positive screen (other than through initiation of treatment), mental health, acceptability, quality of life, adverse events, feasibility, sustainability, and initiation of treatment. We also rated the SOE for reach, which was identified by our implementation scientists as another important outcome for decision making. **Table 1** presents definitions and examples for the 10 prioritized outcomes, and Appendix A, **Table A-9** presents the definitions of SOE ratings.

Table 1. Prioritized outcomes

Outcome Type	Prioritized Outcome	Definition	Examples
Implementation Outcomes	Acceptability	Satisfaction with the clinical intervention being implemented	Provider satisfaction with screening, SBI, or SBIRT process
	Feasibility	Fit or suitability of the clinical intervention for everyday use in the setting in which it was implemented	Provider perception of intervention feasibility
	Reach	Access to the clinical intervention being implemented	Proportion of patients appropriately screened
	Sustainability	Maintenance of the clinical intervention in the setting in which it was implemented	Impacts on other implementation outcomes (e.g., increase in screening rates) sustained overtime
Service Outcomes	Address a positive screen[a]	Immediate, intermediate step taken by provider in response to screening results that meet an established threshold	Proportion of patients who screened positive who were provided brief intervention, an initial plan of care, or a referral to specialist
	Initiation of treatment	Subsequent steps initiated for patients requiring treatment	Started psychotherapy; received guideline-congruent prescription
	Equity	Delivery (including reach, fidelity) of the clinical intervention does not vary by patient characteristics	Differences in any relevant outcomes by subgroup (e.g., race/ethnicity, sex)
Patient Outcomes	Mental health	Severity of a patient's risk factors or symptoms regarding their psychological and emotional well-being at followup	Risk behaviors at followup (not at initial screening)
	Quality of life	Extent to which a patient is healthy, comfortable, and able to enjoy life	Physical, social, emotional, or functional well-being
	Adverse events	Unfavorable outcome experienced by a patient receiving the clinical intervention	Suicide attempt

[a] To facilitate synthesis, delivering brief advice or intervention based on screening results and providing a referral were categorized as addressing a positive screen regardless of whether studies were implementing screening only, SBI, or SBIRT (rather than as fidelity for interventions that included a clear process for when to deliver brief advice or intervention or when to refer patients).

SBI = screening and brief intervention; SBIRT = screening, brief intervention, and referral to treatment.

2.7 Peer Review and Public Commentary

Experts in clinical prevention for children and adolescents and implementation, and individuals representing stakeholder and user communities were invited to provide an external peer review of this systematic review. AHRQ and an associate editor also provided comments. The draft report was posted on the AHRQ website for 4 weeks to elicit public comment. Peer reviewers and public comments noted that quality improvement studies were not well

represented in this review despite their relevance to the topic. In response, we identified three quality improvement studies that did not meet the methodological requirements for inclusion and summarized their findings in the context of this review in the Introduction and Discussion chapters. Additionally, we adopted suggestions from peer reviewers and public commenters to update the title of the report to more accurately reflect its focus on screening and counseling interventions in primary care settings rather than overall prevention of mental health and substance use disorders. The original title was "Implementation of Recommended Screening and Counseling Interventions to Prevent Mental Health and Substance Use Disorders in Children," which was revised to "Implementing Recommended Mental Health and Substance Use Screening and Counseling Interventions in Primary Care Settings for Children and Adolescents." A disposition of comments table of peer and public comments will be posted on the Effective Health Care website about 3 months after publication of this report.

2.8 Use of Artificial Intelligence and/or Machine Learning

During abstract screening, we used DistillerSR's AI capabilities to continually prioritize abstracts with a high likelihood of meeting our inclusion criteria. For the bottom 30 percent of prioritized abstracts (i.e., abstracts with the least likelihood for inclusion), one investigator was substituted with DistillerSR's AI function for screening. Any discrepancies between human investigators and DistillerSR were resolved through review by an additional investigator. We also used DistillerSR's AI function to check for screening errors to reduce the risk of falsely excluded abstracts.

3. Results

We included 11 studies reported in 15 publications for Key Question (KQ) 1.[58-72] We report a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram and detailed study, population characteristics of the studies included for KQ 1, and a list of studies excluded during full-text review in **Appendix B**. Clinical interventions of included studies focused on screening and brief intervention (BI) for depression and suicide risk,[58, 60, 67] eating disorders,[70] substance use,[65, 69, 72] and general behavioral health risk factors.[59, 63, 68, 71] Four studies implemented screening only,[58, 67, 70, 71] four employed screening, BI, and referral to treatment (SBIRT),[59, 60, 65, 72] and three studies utilized screening and BI (SBI) as clinical interventions.[63, 68, 69] We included two studies for Contextual Question 1,[73, 74] which were synthesized separately and described in **Section 3.2**.

There are five randomized controlled trials (RCTs) and six studies with other study designs. Among the RCTs, three studies were randomized at the individual level[63, 68, 69] and two were cluster RCTs.[65, 72] Among the other study designs, there were four were nonrandomized controlled trials,[58, 67, 70, 71] one stepped-wedge trial,[59] and one interrupted time series (ITS).[60] Studies allocated a range of 163 to 8,108 participants, 22 to 354 providers, and 4 to 59 practices.

Study participants ranged from 10 to 21 years of age and five studies reported a mean patient age between 14 and 15 years.[58, 65, 68, 69, 72] Eight studies reported roughly equal proportions of male and female participants,[58, 63, 65, 67-69, 71, 72] and three studies did not report on sex.[59, 60, 70] Seven studies reported the race/ethnicity breakdown of participants,[58, 59, 63, 68, 69, 71, 72] four of which were relatively similar to the general U.S. population.[58, 59, 63, 68] Compared to U.S. demographics, one study reported a relatively higher proportion of Black participants (56%),[71] one reported a relatively higher proportion of Hispanic participants (26%),[69] and one study reported a relatively higher proportion of Black, Asian, and Hispanic participants (71%).[72] Four studies were conducted in Massachusetts,[58, 59, 69, 70] two in Washington,[63, 68] one in California,[72] one in rural Ohio,[60] one in urban Maryland,[65] one in a mix of rural and urban practices in Vermont,[67] and one in a mix of rural and urban practices in Florida.[71]

All included studies were categorized into one of four overarching implementation approaches: behavioral health incorporation,[59, 65, 72] learning collaboratives,[59, 60, 67, 70] clinician support,[58, 63, 68, 72] or technology to facilitate screening or BI.[69, 71] Studies were classified based on the primary implementation strategy employed (**Table 2**), and in instances where multiple implementation approaches occurred, studies were categorized according to the most intensive implementation approach. Behavioral health incorporation was considered the most intensive, followed by learning collaboratives, providing support to clinicians, and finally, the use of technology. For instance, an overarching implementation approach that adds new team members to incorporate behavioral health into a primary care approach defaults to behavioral health incorporation over other approaches such as learning collaboratives or the use of technology. The studied implementation approaches employed a range of 2 to 7 discrete strategies.

Table 2. Definitions of overarching implementation approaches

Implementation Approach	Primary Strategies Involved	Definition of Primary Strategies[39-41]
Behavioral health incorporation	Create new clinical team	Change who serves on the clinical team, adding different disciplines and different skills to make it more likely that the intervention is delivered or is more successfully delivered

3.1 Results, Key Question 1: Implementation Strategies

Implementation Approach	Primary Strategies Involved	Definition of Primary Strategies[39-41]
Learning collaborative	Engage in learning collaborative and provide facilitation/consultation or conduct cyclical tests of change	Facilitate formation of groups of providers or provider organizations and foster a collaborative learning environment to improve implementation of the intervention
		Provide interactive problem-solving or ongoing consultation with experts to support intervention implementation through a supportive interpersonal relationship
		Implement changes in a cyclical fashion using small tests of change before implementing changes system-wide
Clinician support	Facilitate relay of clinical data to providers or provide reminders	Provide as close to real-time data as possible about key measures of process/outcomes in a way that promotes use of the targeted innovation
		Develop reminder systems designed to help clinicians recall information or prompt them to use the intervention
Technology	Use technology or change infrastructure	Technology-based methods to transfer healthcare information and support the delivery of care

Studies compared the implementation approaches to no approach,[58-60, 67, 71, 72] a minimal implementation approach (distributing information material),[63, 68, 70]or other implementation approaches.[65, 69, 72]

Seven studies were supported by public funding,[63, 65, 67-69, 71, 72] one each by a private foundation[58] and private hospital,[59] and one by a professional society.[70] One study did not report a funding source.[60]

Risk of bias assessments of included studies and relevant justifications are reported in **Appendix C**. We rated one study with low risk of bias,[65] four studies with some concerns of bias,[63, 68, 69, 72] six studies with high risk of bias.[58-60, 67, 70, 71] Risk of bias concerns were mostly because of uncontrolled potential confounding in nonrandomized studies.

3.1 Key Question 1. Strategies To Implement Recommended Screening and Counseling Interventions for Mental Health and Substance Use Disorders

We organized findings for the KQ by clinical interventions, summarizing the effectiveness of specific implementation strategies on screening for depression, screening for eating disorders, screening and counseling for substance use, and screening for general behavioral health risk factors. Within each section for a clinical intervention, we begin by detailing the characteristics of the included studies. This includes a brief table summarizing the specific implementation strategies used (**Appendix B** provides a detailed presentation of the implementation approaches). We then present an overview of potential barriers and facilitators. Finally, we summarize the results concerning implementation, service delivery, and patient outcomes.

Due to the limited evidence directly addressing the two subquestions of KQ 1, we have opted not to present these findings separately. Instead, we integrate this evidence into the summary for the main KQ. **Appendix D** presents strength of evidence ratings for outcomes rated as critical or important for decision making.

3.1 Results, Key Question 1: Implementation Strategies

Table 3 summarizes characteristics of included studies and effects of the implementation strategies. Detailed tables presenting abstracted outcome data from each included study and forest plots of meta-analyses are reported in **Appendix E**.

Table 3. Summary of study characteristics and intervention effects of included studies

Clinical Area	Author, Year Study Design, Risk of Bias, and Clinical Intervention	Overarching Implementation Approach (N Practices, N Providers, N Patients)	Comparator Strategy (N Practices, N Providers, N Patients)	Intervention Effects (Implementation Vs. Control) Strength of Evidence
Depression	Dalal 2023[58] NRSI with high risk of bias 2-stage screening (for depression and suicide risk)	Support clinicians (9 practices, 18 providers, 891 patients)	No strategy (9 practices, 14 providers, 1,721 patients)	<u>Patients screened</u> 93.8% vs. 89.1% (p<0.001) Very low SOE for greater effectiveness of implementation strategy <u>Equity</u> Comparable screening rates between racial minorities and White children (94.5% vs. 94.7%; 89.7% vs. 90.7%) Very low SOE for comparable effectiveness
	Harder 2019[67] NRSI with high risk of bias Screening (for depression and suicide risk)	Learning collaborative (17 practices, providers NR, 792 patients)	No strategy (21 practices, providers NR, 772 patients)	<u>Patients screened</u> 90% vs. 75% (p<0.001) Very low SOE for greater effectiveness of implementation strategy Screened with a validated tool 77% vs 32% (p<0.001) SOE not rated[a] <u>Initial plan of care</u> 81% vs. 91% (p=0.05) Very low SOE for greater effectiveness of comparator strategy
	Baum 2020[60] ITS with high risk of bias SBIRT management bundle	Learning collaborative (4 practices, 22 providers, 1,768 patients)	N/A	<u>Patients screened</u> 0% pre-intervention vs. 81% post-intervention (p=NR) Very low SOE for greater effectiveness of implementation strategy <u>Sustainability</u> Over 6 months post-intervention, screening rates remained around 80% Very low SOE for greater effectiveness of implementation strategy
Eating Disorders	Gooding 2017[70] NRSI with high risk of bias Screening (for eating disorders)	Learning collaborative (practices NR, 23 providers, 509 patients)	Educational materials (practices NR, 280 providers, 7,592 patients)	<u>Patients screened</u> 22.0% vs. 5.7% (p<0.0001) Very low SOE for greater effectiveness of implementation strategy <u>High-risk patients screened</u> 30.0% vs. 8.7% (p=0.9) Very low SOE for greater effectiveness of implementation strategy[b]

3.1 Results, Key Question 1: Implementation Strategies

Clinical Area	Author, Year Study Design, Risk of Bias, and Clinical Intervention	Overarching Implementation Approach (N Practices, N Providers, N Patients)	Comparator Strategy (N Practices, N Providers, N Patients)	Intervention Effects (Implementation Vs. Control) Strength of Evidence
Substance Use	Knight, 2019[64, 69] RCT with some bias concerns SBI (for alcohol, marijuana, and other drugs)	Clinician support (reminders) (5 practices, 54 providers [49 analyzed], 628 patients allocated [626 analyzed])	Technology only (5 practices, 54 providers [49 analyzed], 243 patients allocated [243 analyzed])	<u>Time to first post-visit alcohol use</u> High-risk patients: adj HR: 0.69 (0.47 to 1.02) Moderate SOE for greater effectiveness of implementation strategy[b] Low-risk patients: adj HR: 0.87 (0.57 to 1.31) Moderate SOE for comparable effectiveness <u>Time to first post-visit heavy episodic drinking</u> High-risk patients: adj HR: 0.66 (0.40 to 1.10) Moderate SOE for comparable effectiveness <u>Time to first post-visit cannabis use</u> High-risk patients: adj HR: 0.62 (0.41 to 0.94) Moderate SOE for greater effectiveness of implementation strategy Low-risk patients: adj HR: 0.76 (0.44 to 1.32) Moderate SOE for comparable effectiveness <u>Brief advice for high-risk patients</u> Brief advice for avoiding alcohol use: 105/148 (70.9%) vs. 36/63 (57.1%); adj RR: 1.21 (0.95 to 1.52) Moderate SOE for greater Effectiveness of implementation strategy Brief advice for avoiding cannabis use: 122/148 (82.4%) vs. 37/63 (58.7%); adj RR: 1.36 (1.09 to 1.69) Moderate SOE for greater effectiveness of implementation strategy <u>Information about health risks for high-risk patients</u> Information about health risks of alcohol use: 132/148 (89.2%) vs. 47/63 (74.6%); adj RR: 1.22 (1.04 to 1.44) Moderate SOE for greater effectiveness of implementation strategy Information about health risks of cannabis use: 117/148 (79.1%) vs. 40/63 (63.5%) adj RR: 1.34 (1.09 to 1.65) Moderate SOE for greater effectiveness of implementation strategy

3.1 Results, Key Question 1: Implementation Strategies

Clinical Area	Author, Year Study Design, Risk of Bias, and Clinical Intervention	Overarching Implementation Approach (N Practices, N Providers, N Patients)	Comparator Strategy (N Practices, N Providers, N Patients)	Intervention Effects (Implementation Vs. Control) Strength of Evidence
Substance Use (continued)	Mitchell 2020[61, 62, 65, 66] Cluster RCT with low risk of bias SBIRT (for alcohol and other drugs)	Behavioral health incorporation (3 practices, 15 providers, 5,406 patient visits)	Clinician support only (4 practices, 12 providers, 4,233 patient visits)	<u>Screening provided</u> Implementation phase: 64.1% vs. 59.2% (p=0.52) High SOE for comparable effectiveness Sustainability phase: 73.9% vs. 65.6% (p=NR) High SOE for comparable effectiveness <u>Brief advice provided</u> Implementation phase: 30.4% vs. 28.3%, OR=0.84 (95% CI, 0.26 to 2.70) Low SOE for comparable effectiveness Sustainability phase: 32.9% vs. 35.3% (p=NR) Low SOE for comparable effectiveness <u>Brief intervention provided</u> Implementation phase: 8.1% vs. 38.0%, aOR=0.15 (95% CI, 0.04 to 0.56)[b] Low SOE for greater effectiveness of comparator Sustainability phase: 3.8% vs. 43.8% (p=NR) Low SOE for greater effectiveness of comparator
	Sterling 2015[72] Cluster RCT with some bias concerns SBIRT (for substance use)	Behavioral health incorporation with clinician support (practices NR, 17 providers allocated [16 analyzed], 1,558 patients allocated [671 analyzed])	Clinician support only (practices NR, 17 providers allocated [14 analyzed], 1,558 patients allocated [584 analyzed])	<u>Screening</u> 24.3% vs. 25.5% (p=0.44) High SOE for comparable effectiveness <u>Brief intervention provided</u> 25.5% vs. 16.4% (p=NR) Moderate SOE for greater effectiveness of implementation strategy <u>Referral to specialty treatment</u> aOR=0.58 (95% CI, 0.43 to 0.78) Low SOE for greater effectiveness of comparator
	Sterling 2015[72] Cluster RCT with some bias concerns SBIRT (for substance use)	Clinician support (practices NR, 17 providers allocated [14 analyzed], 1,558 patients allocated [584 analyzed])	No strategy (practices NR, 18 providers allocated [16 analyzed], 1,769 allocated [616 analyzed])	<u>Brief intervention provided</u> 16.4% vs. 1.8%; OR=10.37 (95% CI, 5.45 to 19.74) Moderate SOE for greater effectiveness of implementation strategy <u>Referral to specialty treatment</u> aOR=1.11 (95% CI, 0.83 to 1.49) Low SOE for comparable effectiveness

3.1 Results, Key Question 1: Implementation Strategies

Clinical Area	Author, Year Study Design, Risk of Bias, and Clinical Intervention	Overarching Implementation Approach (N Practices, N Providers, N Patients)	Comparator Strategy (N Practices, N Providers, N Patients)	Intervention Effects (Implementation Vs. Control) Strength of Evidence
General Behavioral Health	Thompson 2016[71] NRSI with high risk of bias Screening (for general health risks)	Technology (computerized assessment) (20 practices, providers NR, 99 patients)	No strategy (2 practices, providers NR, 64 patients)	<u>Screening for risky behaviors</u> 0.36 vs. 0.05 (p=0.03) Very low SOE for greater effectiveness of implementation strategy <u>Mental health screening</u> 0.42 vs. 0.08 (p<0.01) Very low SOE for greater effectiveness of implementation strategy
	Richardson 2019[68] RCT with some bias concerns SBI (broad assessment including alcohol and other drugs and depression)	Support clinicians (relay data) (practices and providers NR, 147 patients allocated [141 analyzed])	Educational materials (practices and providers NR, 153 patients allocated [151 analyzed])	<u>Counseling for moderate or high-risk behaviors</u> aRR = 1.32, 95% CI 1.07 – 1.63 High SOE[c] for greater effectiveness of implementation <u>Risky behaviors</u> 3.25 vs. 2.89 at 3 months (p=0.08) High SOE[c] for comparable effectiveness
	Richardson 2021[63] RCT with some bias concerns SBI (broad assessment including alcohol and other drugs and depression)	Support clinicians (relay data) (practices and providers NR, 145 patients)	Educational materials (practices and providers NR, 155 patients)	<u>Counseling for moderate or high-risk behaviors</u> aRR = 1.36, 95% CI 1.04 – 1.78 High SOE[c] for greater effectiveness of implementation <u>Risky behaviors</u> 2.74 vs. 2.68 at 3 months(p=0.81) High SOE[c] for comparable effectiveness 2.76 vs. 2.58 at 6 months (p=0.45) Moderate SOE for comparable effectiveness

Clinical Area	Author, Year Study Design, Risk of Bias, and Clinical Intervention	Overarching Implementation Approach (N Practices, N Providers, N Patients)	Comparator Strategy (N Practices, N Providers, N Patients)	Intervention Effects (Implementation Vs. Control) Strength of Evidence
General Behavioral Health (continued)	Walter 2021[59] Stepped-wedge trial with high risk of bias Stepped care via SBIRT (for behavioral, social, and emotional screening)	Behavioral health incorporation (with learning collaborative) (59 practices, 354 providers allocated [125 analyzed], 464 to 28,369 patients per practice)	No strategy	<u>Screening for risky behaviors</u> 73.9% vs. 55.6%; aOR=1.25, 95% CI, 1.21 to 1.29 Very low SOE for greater effectiveness of implementation strategy <u>Address positive screen</u> 177 vs. 107 primary care behavioral health visits per 1,000 patient years; aRR=1.2, 95% CI, 1.1 to 1.3 Very low SOE for greater effectiveness of implementation strategy <u>Initiation of treatment</u> 176 vs. 15 psychotherapy visits per 1,000 patient years; aRR=6.7, 95% CI 5.8 to 7.7 Low SOE for greater effectiveness of implementation strategy 362 vs. 362 guideline-congruent ADHD prescriptions per 1,000 patient years; aRR=1.01, 95% CI, 0.96 to 1.07 Very low SOE for comparable effectiveness 190 vs. 57 guideline-congruent SSRI prescriptions per 1,000 patient years; aRR 1.3, 95% CI, 1.2 to 1.4 Very low SOE for greater effectiveness of implementation strategy

[a] SOE for screening in this study was assessed only for overall screening.
[b] Difference is not statistically significant.
[c] Data for this outcome were pooled across studies, resulting in a high certainty of evidence.
ADHD = attention deficit hyperactivity disorder; aRR = adjusted risk ratio; aOR = adjusted odds ratio; CI = confidence interval; HR = hazard ratio; ITS = interrupted time series; N = number; NR, not reported; NRSI = non-randomized study of interventions; OR = odds ratio; RCT = randomized controlled trial; RR = risk ratio; SBI = screening and brief intervention; SBIRT = screening, brief intervention, and referral to treatment; SOE = strength of evidence; SSRI = selective serotonin reuptake inhibitors; vs. = versus.

3.1.1 Key Points

3.1.1.1 Implementation Approaches Compared With No or Minimal Implementation Strategies

- Learning collaboratives or supporting clinicians may increase screening for depression, potentially leading to a sustainable increase in screening. However, the evidence is very uncertain based on two nonrandomized controlled trials (47 practices, N providers not reported [NR]) and an ITS study (4 practices, 22 providers) (very low strength of evidence [SOE]).

- A learning collaborative may increase screening for eating disorders compared with

print-only information. However, the evidence is very uncertain based on a single nonrandomized controlled trial (85 practices, 303 providers) (very low SOE).

- A multifaceted approach to clinician support probably improves the provision of BI for substance use or mental health risks (moderate SOE) but not referrals to specialty treatment (low SOE) based on one RCT (30 providers, 1,200 patients).

- Clinician support did not reduce moderate- and high-risk behaviors despite an increase in counseling compared with the distribution of educational materials (600 patients) (high SOE).

- Multifaceted implementation strategies that take an overarching approach like leveraging technology or incorporating behavioral health into primary care may increase screening rates for general behavioral health risk factors, but the evidence is very uncertain from two nonrandomized controlled studies (engaging a total of 81 practices; very low SOE leveraging technology and very low SOE for incorporating behavioral health).

3.1.1.2 Implementation Approaches Compared With One Another

- Behavioral health incorporation-based approaches and clinician support lead to comparable improvements of screening for alcohol, tobacco, and other drug use (high SOE) based on two RCTs (19 providers, 9,639 visits; 30 providers, 1,255 patients). Likewise, the provision of brief advice may be comparable between behavioral health incorporation and clinician support (low SOE) based on one RCT (19 providers, 9,639 visits).

- The evidence is inconsistent for the effectiveness of adding behavioral health incorporation approaches to clinician support, compared to clinician support alone, in delivering BIs for adolescents screening positive for alcohol, tobacco, or other drug use. One RCT (19 providers, 9,639 visits) showed that adding incorporated behavioral health via specialist sites led to fewer BIs than clinician support alone (low SOE). Another RCT (30 providers, 1,255 patients) found that adding behavioral health with an embedded provider resulted in more BIs (moderate SOE) and fewer referrals to specialty treatment of tobacco, alcohol, or drug use (low SOE) compared to clinician support only.

- Clinician support with computer-based reminders (NR providers, 869 patients) probably improves delivery of brief advice and provision of information on health risks of alcohol and cannabis use and probably prolongs time to alcohol or cannabis use among high-risk adolescents compared with technology use (computerized screening without reminders) (moderate SOE) based on one RCT. Clinician support with computer-based reminders and technology use without reminders (NR providers, 869 patients) probably lead to comparable time to alcohol or cannabis use among low-risk adolescents, or time to heavy episodic alcohol use among high-risk adolescents (moderate SOE).

- Although supporting clinicians to implement SBI for general behavioral health risks had little to no effect on mental health risk behaviors at followup (based on 2 RCTs

conducted at 5 practices; high SOE at 3-month followup and moderate SOE at 6-month followup), approaches that embed behavioral health providers to implement SBIRT models may increase subsequent rates of addressing a positive screen (very low SOE) and initiation of certain types of treatment (low SOE for psychotherapy, very low SOE for guideline concordant prescribing; based on a nonrandomized stepped-wedge controlled study with 59 practices).

3.1.2 Summary of Findings

Table 4 provides a detailed evidence map, summarizing the SOE concerning the effectiveness of different implementation strategies compared with control strategies, across prioritized implementation, service, and patient outcomes. Color is for emphasis only. For a large number of prioritized outcomes, we did not find any eligible evidence.

3.1.2 Results, Key Question 1: Implementation Strategies, Summary of Findings

Table 4. Evidence map

Note: a version of this table that is more accessible for people with visual difficulties is located in **Appendix F** (references used in the appendix are listed in **Appendix G**).

	Behavioral Health Incorporation (BHI)			**Learning Collaborative (LC)**		**Clinician Support (CS)**				**Technology**
Implementation strategy[a]	BHI	BHI with learning collaborative	BHI with clinician support	LC	LC	CS	CS	CS	CS	Technology
Comparator strategy	Clinician support	No strategy	Clinician support only	No strategy	Distribute educational material only	No strategy	Technology without reminders	No strategy	Distribute educational material only	No strategy
Clinical intervention/ condition	SBIRT for substance use[65]	SBIRT for general behavioral health risks[59]	SBIRT for substance use[72]	Screening[67] or SBIRT[60] for depression and suicide risk	Screening for eating disorders[70]	Screening for depression[58]	SBI for substance use[69]	SBIRT for substance use[72]	SBI for general behavioral health risks[63, 68]	Screening for general behavioral health risks[71]
Priority implementation outcomes										
Acceptability	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence
Feasibility	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence
Reach	Screening[d] ●●●	Screening[b] ●○○○	Screening[d] ●●●●	Screening[b] ●○○○	Screening[b] ●○○○ Screening in high-risk patients[c] ●○○○	Screening[b] ●○○○	No evidence	No evidence	No evidence	Screening for risky behaviors[b] ●○○○ Screening for mental health concerns[b] ●○○○
Sustainability	Screening[d] ●●●● Brief advice[d] ●●○○ Brief intervention[e] ●●○○	No evidence	No evidence	Screening[b] ●○○○	Screening[b] ●○○○	No evidence	No evidence	No evidence	No evidence	No evidence
Priority service outcomes										
Equity	No evidence	No evidence	No evidence	No evidence	No evidence	Screening of disadvantaged groups[d] ●○○○	No evidence	No evidence	No evidence	No evidence
Address positive screen	Brief advice[d] ●●○○	Primary care behavioral health visits[b] ●○○○	Brief intervention[b] ●●●○	Initial plan of care[e] ●○○○	No evidence	No evidence	Brief advice[b] ●●●○	Brief intervention[b] ●●●○	Counseling for moderate and high-risk behaviors[b] ●●●●	No evidence

3.1.2 Results, Key Question 1: Implementation Strategies, Summary of Findings

	Behavioral Health Incorporation (BHI)			Learning Collaborative (LC)		Clinician Support (CS)				Technology
	Brief intervention[e] ●●○○		Referral to specialty treatment[e] ●●○○					Referral to specialty treatment[d] ●●○○		
Initiation of treatment	No evidence	Psychotherapy visits[b] ●●○○ Guideline concordant ADHD prescribing[d] ●○○○ Guideline concordant SSRI prescribing[b] ●○○○	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence
Priority patient outcomes										
Mental health	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	Alcohol use among high-risk[c] ●●●○ Alcohol use among low risk[d] ●●●○ Heavy episodic drinking among high risk[d] ●●●○ Cannabis use among high risk[b] ●●●○ Cannabis use among low risk[d] ●●●○	No evidence	Risk behavior score at 3 months[d] ●●●● Risk behavior score at 6 months[d] ●●●○	No evidence
Quality of life	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence
Adverse events	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence

Legend:							
Favors implementation strategy[b]	Favors implementation strategy but effect does not reach statistical significance[c]	Comparable effectiveness[d]	Favors comparator or no strategy[e]	●○○○ Very low SOE	●●○○ Low SOE	●●●○ Moderate SOE	●●●● High SOE

3.1.2 Results, Key Question 1: Implementation Strategies, Summary of Findings

[a] All included studies were categorized into one of four overarching implementation approaches: incorporating behavioral health into primary care, engaging learning collaboratives, providing support to clinicians, and using technology to facilitate screening or brief intervention. Studies were classified based on the primary implementation strategy employed, and in instances where multiple implementation approaches occurred, studies were categorized according to the most intensive implementation approach. Behavioral health incorporation was considered the most intensive, followed by learning collaboratives, providing support to clinicians, and finally, the use of technology. For instance, an overarching implementation approach that adds new team members to incorporate behavioral health into primary care approach defaults to behavioral health incorporation over other approaches such as learning collaboratives or the use of technology.
[b] Findings favor the implementation strategy.
[c] Findings favor the implementation strategy but the effect does not reach statistical significance.
[d] Findings demonstrate comparable effectiveness of the implementation strategy and comparator strategy.
[e] Findings favor the comparator or no strategy, that is, greater instances of the outcome in the comparator group. Whether this is desirable or not depends on a practice's intent when incorporating a behavioral health clinician into their practice.
ADHD = attention deficit hyperactivity disorder; BHI = behavioral health incorporation; CS = clinician support; LC = learning collaborative; SBI = screening and brief intervention; SBIRT = screening, brief intervention, and referral to treatment; SOE = strength of evidence; SSRI, selective serotonin reuptake inhibitor.

3.1.3 Findings by Clinical Area: Screening for Depression

3.1.3.1 Characteristics of Included Studies

Three studies, two nonrandomized controlled trials[58, 67] and one ITS study,[60] evaluated implementation strategies to increase screening for depression and suicide risk among adolescents in pediatric primary care settings (Appendix B, **Table B-1**). We rated all three studies as having high risk of bias, primarily due to uncontrolled potential baseline confounding or inadequate statistical analysis. **Table 5** summarizes the implementation and comparison strategies for each included study; further details about implementation strategies used in these studies are reported in **Appendix B**.

One nonrandomized controlled trial conducted in Massachusetts[58] implemented a **clinician support-based implementation approach** to implement a two-stage screening for depression and suicide risk. Patients were first screened using the Pediatric Symptom Checklist (PSC-17). If the results indicated at risk, the Patient Health Questionnaire (PHQ-9) was then used for a more in-depth assessment.[58] The study involved nine pediatric primary care practices within a network.[58] Eighteen out of 32 physicians opted to voluntarily participate in the clinician support project, while the remaining 14 chose not to participate. Overall, 891 patients ages 12 to 18 years were seen by physicians participating in the clinician support project, while 1,756 were seen by physicians not participating in the project.[58] Patients seen by physicians participating in the clinician support-based quality improvement (QI) project were largely non-Hispanic (84.6%), White (83.8%), and preferred the English language (94.0%). Physicians participating in the clinician support-based QI project received comprehensive implementation support over the 3-month implementation period, including training Webinars, data reviews, and conference calls structured around two main intervention periods.

Two studies, one nonrandomized controlled trial[67] and one ITS study,[60] utilized a **learning collaborative implementation approach** to assess the outcomes of a two-stage screening process[67] or an SBIRT model[60] for depression and suicide risk. The nonrandomized controlled trial conducted in Vermont[67] focused on patients ages 12 to 18 years attending health supervision visits at 38 pediatric and family medicine practices that were part of a voluntary QI network of pediatric-serving practices.[67] The implementation period lasted 7 months, with 17 of the 38 practices and 792 of the 1,564 patients engaged in the learning collaborative implementation approach. Twenty-one practices (with 772 patients) from the same network did not receive implementation support and served as the study's control group. Participating practices engaged in a multifaceted learning collaborative implementation approach aimed at enhancing practitioners' knowledge and office systems regarding adolescent depression screening and had the autonomy to choose the depression screening tool that best suited their specific needs from those listed in the American Academy of Pediatrics Mental Health Toolkit.[67] Practices engaged in the learning collaborative implementation approach were composed of 33 percent of patients insured through Medicaid, compared with 40 percent of patients at control practices. Both groups had a similar proportion of female patients (53% and 51%, respectively).

The other study implementing a **learning collaborative implementation approach** conducted in rural Ohio focused on patients ages 11 to 18 years seen at any of the four participating pediatric primary care practices. Participating practices were part of a pediatric accountable care organization, Partners For Kids, and consisted of medical providers ranging from 2 to 10 providers per practice, with a patient population across practices of at least 40 percent insured by Medicaid.[60] Practices engaged in learning collaborative QI efforts over a 6-

month implementation period, including an interactive learning session and educational materials.[60] The primary objective was to improve depression management through a depression management bundle, which consisted of depression screening, safety assessments, BI, and followup plans (i.e., an SBIRT model).

3.1.3 Results, Key Question 1: Implementation Strategies, Findings by Clinical Area: Screening for Depression

Table 5. Strategies[a] used in studies on screening for depression

Author, Year Study Design and Risk of Bias	Clinical Intervention	Overarching Implementation Approach	Strategy: Evaluate & Iterate	Strategy: Interactive Assistance	Strategy: Select, Adapt, Tailor	Strategy: Develop Relationships	Strategy: Train & Educate	Strategy: Support Clinicians	Strategy: Engage Patients	Strategy: Change Infrastructure	Comparison Strategy[a]
Dalal 2023[58] NRSI with high risk of bias	Screening (2-stage)	Support clinicians (reminders)	N/A	N/A	N/A	Organize clinician implementation team meetings	Conduct educational meetings	Provide reminders	N/A	N/A	No strategy
Harder 2019[67] NRSI with high risk of bias	Screening	Learning collaborative	Assess for readiness, conduct cyclical tests of change	Provide facilitation	Select based on practice and setting	Use workgroups	Engage in learning collaborative	N/A	N/A	N/A	No strategy
Baum 2020[60] ITS with high risk of bias	SBIRT (management bundle)	Learning collaborative	Develop implementation blueprint, conduct cyclical tests of change	Provide facilitation	N/A	N/A	Make training dynamic, engage in learning collaborative	N/A	N/A	N/A	N/A

[a] Implementation strategies are defined in Appendix A, Table A-7.
ITS = interrupted time series; N/A = not applicable; NRSI = non-randomized study of interventions; SBIRT = screening, brief intervention, and referral to treatment.

3.1.3.2 Overview of Potential Barriers and Facilitators

All three studies reported practice or provider characteristics that could influence implementation of screening[67 58] and SBIRT,[60] but did not report whether implementation strategies impacted them or subsequent outcomes. In the study evaluating a **clinician support-based implementation approach** to implementing screening,[58] adoption of a standardized template in the electronic health record to increase screening rates was inconsistent; only about half of the pediatricians utilized it, while others preferred free text notes over the structured templates. For the **learning collaborative implementation approach** to implementing screening, practices engaged in the clinician support-based approach had a smaller presence in Federally qualified/certified rural areas (11% clinician support-based approach; 28% control; $p<0.001$) and a greater presence in the largest metropolitan area (47% clinician support-based approach; 31% control; $p<0.001$).[67] For the other study evaluating a **learning collaborative implementation approach** to implementing SBIRT[60] prior to the start of the project, practices reported that depression screening was not a standard practice and among a sample of 15 charts, 0 percent had documented screening at baseline.

3.1.3.3 Results for Implementation, Service, and Patient Outcomes

3.1.3.3.1 Clinician Support

Findings from one nonrandomized controlled trial[58] suggest that a **clinician support-based implementation approach** may increase screening rates, but the evidence is very uncertain (very low SOE). Reach was assessed using PSC-17 first-stage screening rates among children. The study reported that screening adolescents with the PSC-17 was standard of care across sites, yet patients under the care of providers receiving implementation support were significantly more likely to be screened than those in the control group after 3 months (93.8% vs. 89.1%, $p<0.01$).[58] Disadvantaged racial or ethnic groups were screened at rates comparable to non-Hispanic White patients. This was observed in both patients seen by providers receiving implementation support and patients seen by providers in the control group (providers receiving implementation support: 94.5% vs. 94.7%; control: 89.7% vs. 90.7%). This indicates that a **clinician support-based implementation approach** may not introduce inequity, but the evidence is very uncertain (very low SOE).[58] Finally, provider fidelity to administering second stage screening using the PHQ-9 for adolescents who scored at risk on the PSC-17 was also higher in the practices implementing the clinician support-based approach than in the control group (54.8% vs. 16.1%, $p<0.001$).

3.1.3.3.2 Learning Collaborative

Findings of the second nonrandomized controlled trial[67] and the ITS study[60] consistently indicated that a **learning collaborative implementation approach** may increase the rate of screening, reflecting greater reach among patients, but the evidence is also very uncertain (very low SOE). In the nonrandomized controlled trial, the providers engaged in the learning collaborative showed an increase in depression screening rates among children compared with the control group (90% vs. 75%, $p<0.001$). In addition, children at practices participating in the learning collaborative had over three times greater odds of having any depression screening at followup than controls (adjusted odds ratio [aOR] 3.53, 95% confidence interval [CI], 1.14 to 10.98).[67] In the ITS study, screening for depression increased from 0 percent among participating

practices at baseline to 28 percent within 3 months and to 81 percent within 6 months of engaging in the learning collaborative.[60]. This study also assessed sustainment of screening practices, finding that screening rates remained around 80 percent after practices standardized the screening process following the initial 6-month learning collaborative implementation period.[60] Only one of the two studies assessing learning collaboratives reported fidelity to the intervention being implemented.[67] Of those screened, more patients receiving care from practices engaged in the learning collaborative were screened with a validated tool than in the control group (77% vs. 32%, p<0.001; aOR 37.51, 95% CI, 7.67 to 183.48). Addressing a positive screen was also only reported by one of the studies evaluating the learning collaborative implementation approach.[67] Fewer patients in the learning collaborative implementation approach had an initial plan of care documented than in the control group (81% vs. 91%, p=0.05).[67]

3.1.4 Findings by Clinical Area: Screening for Eating Disorders

3.1.4.1 Characteristics of Included Studies

For eating disorders, we included one nonrandomized controlled trial with high risk of bias because of concerns about confounding, missing data, and deviations from the intended interventions (Appendix B, **Table B-2**).[70] The study compared the impact of a comprehensive **learning collaborative implementation approach** with a discrete educational strategy in increasing screening for eating disorders in patients ages 10 to 21 years within pediatric primary care practices. **Table 6** summarizes the implementation and comparisons strategies; further details about implementation strategies used in these studies are reported in **Appendix B**.

The study involved 303 practitioners working in 85 pediatric primary care practices within an independent practice organization in Eastern Massachusetts. It compared a multifaceted active-learning strategy with a discrete print-learning strategy. Although the practitioners in the print-learning group received educational materials, those in the active-learning group participated in a learning collaborative model. Practitioners in the active-learning group further undertook cyclical tests of change, a process classified as an “evaluate and iterate implementation” strategy.

3.1.4 Results, Key Question 1: Implementation Strategies, Findings by Clinical Area: Screening for Eating Disorders

Table 6. Strategies[a] used in study on screening for eating disorders

Author, Year **Study Design and Risk of Bias**	**Clinical Intervention**	**Overarching Implementation Approach**	**Strategy: Evaluate & Iterate**	**Strategy: Interactive Assistance**	**Strategy: Select, Adapt, Tailor**	**Strategy: Develop Relationships**	**Strategy: Train & Educate**	**Strategy: Support Clinicians**	**Strategy: Engage Patients**	**Strategy: Change Infrastructure**	**Comparison Strategy[a]**
Gooding 2017[70] NRSI with high risk of bias	Screening	Learning collaborative	Conduct cyclical tests of change	N/A	N/A	N/A	Engage in learning collaborative, make training dynamic	N/A	N/A	N/A	Train & Educate (distribute materials)

[a] Implementation strategies are defined in Appendix A, Table A-7.
N/A = not applicable; NRSI = non-randomized study of interventions.

3.1.4.2 Overview of Potential Barriers and Facilitators

Most of the practitioners in the active-learning and print-learning groups were physicians (74% and 76%) and had been in practice for about 20 years (20.4 years and 19.6 years). The other participants were either nurse practitioners or physician assistants. Notably, at the outset of the study, only 4.5 percent of patients seen by practitioners in both groups had documented screening for eating disorders in their medical charts. The study authors did not report whether provider characteristics influenced outcomes. The implementation strategies, however, had variable influence on provider knowledge and satisfaction. Practitioners in the active-learning group had greater knowledge (median eating disorder knowledge score: 11 versus 7 out of a possible 12; p-value not reported) and expressed greater satisfaction with their training compared with those in the print-learning group ($p<0.01$). Still, both groups reported similar levels of comfort in screening and medical monitoring, and treatment of eating disorders were also similar for both groups before and after receiving their respective implementation strategies.

3.1.4.3 Results for Implementation, Service, and Patient Outcomes

3.1.4.3.1 Learning Collaborative

Findings of the study indicated that a **learning collaborative** may increase reach, reflected by the rate of screening, but the evidence is very uncertain (very low SOE). Compared to the print-learning group, the active-learning group showed a greater increase in screening documented in charts from pre- to post-intervention (active-learning: from 4.7% to 22.0%; print-learning: from 4.5% to 5.7%; $p<0.0001$). Although in high-risk patients (whose body mass index [BMI] was below the 5th percentile for age and sex or whose BMI drop from the prior year was in the largest 5% of BMI reductions), the active-learning group also showed a numerically greater increase in documented screening, the difference between groups did not reach statistical significance (active-learning: from 14.3% to 30.0%; print-learning: from 3.2% to 8.7%; $p=0.9$).

Practitioners' self-reported screening was higher than documented in charts; however, the increase in practitioner-reported screening was comparable between the two groups (active-learning: from 65.9% to 70.8%; print-learning: from 45.6% to 49.7%; $p=0.8$).

3.1.5 Findings by Clinical Area: Substance Use Disorders

3.1.5.1 Characteristics of Included Studies

For substance use (including alcohol and tobacco) screening, we included three RCTs,[65, 69, 72] two of which were cluster RCTs (Appendix B, **Table B-3**).[65, 72] We assessed the risk of bias as *low* for one study.[65] For the remaining two studies, we assessed the risk of bias as *some concerns* due to concerns about randomization (baseline differences in the patient population)[72] and potential deviations from the intervention (providers trained to provide counseling treated participants from both the clinical reminders and comparison groups), as well as missingness of data (individuals who engaged in substance use behaviors may be less likely to return for followup visits with provider).[69] **Table 7** provides a description of the implementation strategies evaluated across the three studies; further details about implementation strategies used in these studies are reported in **Appendix B**.

3.1.5 Results, Key Question 1: Implementation Strategies, Findings by Clinical Area: Substance Use Disorders

One trial compared the effectiveness of adding provider reminders to form a **clinician support-based implementation approach** to technology without reminders.[69] This study was conducted over 24 months in five urban pediatric primary care centers in Boston to assess the feasibility and acceptability of implementing a computer-facilitated screening and clinician-delivered BI (cSBI) for youth ages 12 to 18 years.[69] A total of 54 providers were trained to provide counseling, after which patients (n=869) were randomized to receive either cSBI with provider reminders or technology without reminders.[69]

The remaining two trials, both cluster RCTs, assessed the impact of **incorporation-based approaches** to increase screening rates[65, 72] One evaluated the implementation of SBIRT within seven urban Federally Qualified Health Centers in Baltimore City.[65] The study compared the use of two different service delivery models—a Specialist model and a Generalist model—to improve screening rates over the course of 20 months. In both groups, medical assistants administered the CRAFFT (Car, Relax, Alone, Forget, Friends, and Trouble) substance use screen and scored the results; patients with scores of 2 or higher (classified as *high-risk* patients) then received BI. In the specialist model (intervention group), behavioral health counselors delivered the BI, wherein the generalist model (comparison group) required primary care providers to deliver the BI. Study authors hypothesized that outcomes would be better at generalist sites that included support for clinicians but no embedded behavioral health counselor.[65]

The second study to assess the impact of behavioral health incorporation to improve substance use screening for adolescents ages 12 to 18 years was a three-arm trial conducted within a large general pediatric clinic in Baltimore City.[72] Providers were randomized to one of three arms: (1) providers were trained to deliver SBIRT independently; (2) providers had access to a trained behavioral healthcare practitioner, who was embedded within the practice to deliver SBIRT; and (3) usual implementation, wherein providers received no training or access to a behavioral healthcare practitioner. All patients completed a self-administered comprehensive health screening tool embedded in the electronic health record (EHR), the Teen Well Check Questionnaire (TWCQ), at registration for their well-child care visit.[72] The pediatrician or the behavioral health provider assessed patients who endorsed mental health or substance use risk in the TWCQ using the CRAFFT+. For this review, we categorized the more intensive intervention (behavioral health incorporation plus clinician support) as the primary implementation strategy and report outcomes when compared with the clinician support only.[72] In addition, we report outcomes from the comparison of the arm that included provider support only versus usual implementation.[72]

3.1.5 Results, Key Question 1: Implementation Strategies, Findings by Clinical Area: Substance Use Disorders

Table 7. Strategies[a] used in studies on screening for alcohol, tobacco, and substance use

Author, Year Study Design and Risk of Bias	Clinical Intervention	Overarching Implementation Approach	Strategy: Evaluate & Iterate	Strategy: Interactive Assistance	Strategy: Select, Adapt, Tailor	Strategy: Develop Relationships	Strategy: Train & Educate	Strategy: Support Clinicians	Strategy: Engage Patients	Strategy: Change Infrastructure	Comparison Strategy[a]
Knight 2019[64, 69] (RCT with some bias concerns)	SBI	Support clinicians (reminders)	N/A	N/A	N/A	N/A	Make training dynamic	Provide reminders	N/A	Use technology	Technology without reminders
Mitchell 2020[61, 62, 65, 66] (Cluster RCT with low risk of bias)	SBIRT	Incorporation	Conduct audit and feedback	Centralize technical assistance	N/A	Identify and prepare champion	Conduct ongoing training	Create new clinical team; facilitate relay of clinical data to providers	N/A	N/A	Clinician support without incorporation
Sterling 2015[72] (Cluster RCT with some bias concerns)	SBIRT	Incorporation (with clinician support)	Conduct audit and feedback	Centralize technical assistance; provide ongoing consultation	N/A	N/A	Conduct educational meetings; distribute educational materials	Create new clinical team; provide reminders	N/A	N/A	Clinician support without incorporation
		Support clinicians	Conduct audit and feedback	Centralize technical assistance; provide ongoing consultation	N/A	N/A	Conduct educational meetings; distribute educational materials	Provide reminders	N/A	N/A	Usual implementation

[a] Implementation strategies are defined in Appendix A, Table A-7.
N/A = not applicable; RCT = randomized controlled trial; SBI = screening and brief intervention; SBIRT = screening, brief intervention, and referral to treatment.

3.1.5.2 Overview of Potential Barriers and Facilitators

The trial assessing **clinician support** to facilitate implementation of cSBI reported practice type and compatibility of cSBI within existing clinical workflows but did not report whether these were impacted by the implementation strategies leveraged.[69] The trial involved 54 primary care providers distributed between community practices (n=3) and hospital-based clinics (n=2). The cSBI was generally well-received by patients, but some providers expressed reservations regarding the use of tablets to administer screenings.[69] Some providers also expressed concerns about the additional time required for the cSBI and suggested that it be incorporated into the EHR to minimize disruptions to the clinical workflows and decrease the amount of time required to administer the screening and BI.[69]

Within the two-arm cluster RCT that assessed an **incorporation-based approach** within specialist and generalist sites, both adolescent and provider characteristics were similar across sites.[65] The SBIRT intervention was tailored to each site to improve incorporation into the facility's workflow and processes. Additionally, leadership support for implementation was reported, with the designation of the medical director as an "Organizational Champion."[65] In the three-arm cluster RCT, researchers compared the implementation of SBIRT among a diverse patient population.[72] There were slight differences in patient characteristics and mental health symptoms across study arms. For instance, compared to the usual implementation arm, there were more female patients (57.4% in the pediatrician-only arm, 52.0% in the embedded behavioral healthcare provider arm, and 47.0% in the usual implementation arm) and more Black patients (34.5% in the pediatrician-only arm, 33.9% in the embedded behavioral healthcare provider arm, and 28.4% in the usual implementation arm) represented in the incorporation with clinician support and clinician support-only arms. There were no reports on whether the incorporation-based approaches had any effect on potential barriers or facilitators in either study.[65, 72]

3.1.5.3 Results for Implementation, Service, and Patient Outcomes

3.1.5.3.1 Clinician Support

The impact of **clinician support** on service outcomes for substance use was reported in the three-arm cluster RCT.[72] Compared with patients who received care from providers in the usual implementation arm, patients in the clinician support arm were more likely to receive BIs for substance use or mental health (16.4% vs. 1.8%; aOR=10.37; 95% CI, 5.45 to 19.74) (moderate SOE).[72] However, clinician support likely has no effect on the rate of referrals to specialty treatment, compared to usual care (aOR=1.11 [95% CI: 0.83 to 1.49]) (low SOE).[72]

The trial evaluating a **clinician support-based approach** to implement cSBI with provider reminders reported better delivery of brief advice and provision of information on health risks of alcohol and cannabis use (four separate outcomes) for high-risk youth (i.e., who reported any use of alcohol or cannabis in the past 12 months at baseline); the adjusted risk ratio (aRR) ranged from 1.21 to 1.36 (moderate SOE) versus cSBI without reminders but little to no effect on patients' substance use outcomes.[69] Clinician support (in the form of dynamic training and reminders) was associated with improved brief advice delivery for alcohol and cannabis use, aRR 1.21 (95% CI, 0.95 to 1.52) and aRR 1.36 (95% CI, 1.09 to 1.69), respectively, and information about health risks of alcohol and cannabis use, aRR 1.22 (95% CI, 1.04 to 1.44) and aRR 1.34 (95% CI, 1.09 to 1.65), respectively, versus technology without reminders. The addition of provider reminders likely increases time to first post-visit alcohol use for high-risk

adolescents (97 median days [interquartile range {IQR} 51 to 222] vs. 44 [21 to 143]; adjusted hazard ratio [adj HR]=0.69 [0.47 to 1.02]) (moderate SOE) but results in little to no difference in time to first post-visit heavy episodic drinking for high-risk adolescents (366 median days [IQR 124 to 366] vs. 213 [51 to 366]; adj HR=0.66 [0.40 to 1.10]) (moderate SOE). The use of clinician support also likely has little to no effect on time to first post-visit alcohol use among low-risk adolescents (366 [338 to 366] vs. 366 [334 to 366]; adj HR=0.87 [0.57 to 1.31]) (moderate SOE).[69] However, high-risk adolescents in the cSBI arm with provider reminders reported a longer time to first use of cannabis post-intervention compared with high-risk adolescents in the technology without reminders group (101 median days [IQR 33 to 226] vs. 83 [27 to 152]; adj HR=0.62; 95% CI, 0.41 to 0.94) (moderate SOE).[69] These findings suggest that the clinician support-based implementation approach is likely to increase the length of time post-visit for cannabis use (moderate SOE).[69]

3.1.5.3.2 Incorporation

Both cluster RCTs that evaluated **incorporation-based implementation approaches** reported rate of screening or assessment. In the two-arm trial, adolescents receiving care from an incorporated clinical team reported screening rates similar to those reported by adolescents receiving care from a primary care-only clinical team in the implementation phase (64.1% vs. 59.2%, p=0.52) and in the sustainability phase (73.9% vs. 65.6%, p-value NR) (high SOE)[65] In the three-arm trial, compared to clinician support only (i.e., pediatricians trained to provide SBI), adding behavioral incorporation via an embedded behavioral healthcare provider does not increase assessment rates (24.3% vs. 25.5%; aOR=0.93 [95% CI, 0.72 to 1.21]) (high SOE).[72]

In one of the two cluster RCTs, incorporation had little to no effect on the rate of brief advice provided compared to clinician support in the implementation phase (30.4% vs. 28.3%; aOR=0.84 [95% CI, 0.26 to 2.70]), but the evidence is uncertain (low SOE). Similarly, an incorporation-based approach may result in lower rates of BI, compared with support for generalists only (low SOE). Patients at the incorporated specialist sites were less likely to receive (BI than the generalists sites in the implementation phase (8% vs. 38%; aOR=0.15 [95% CI, 0.04 to 0.56]).[65] The similar rate of brief advice (32.9% vs. 35.3%, p=0.50; low SOE) and difference in BI remained during the sustainability phase of the study BI: 3.8% vs. 43.8%, p<0.001; aOR=NR [low SOE]).

In contrast, patients in the incorporation arm of the three-arm cluster RCT were more likely to receive BIs for substance use or mental health compared to clinician support only (25.5% vs. 16.4%; aOR=1.74 (95% CI, 1.31 to 2.31) (moderate SOE).[72] Although the results for overall provision of BI are inconsistent for the two studies,[65, 72] when examining BI for substance use only (i.e., excluding BI for mental health), the results are consistent and favor the comparator strategy. Providers in the clinician support-only arm provided BIs that contained substance use content more often than did providers in the arm with embedded behavioral healthcare providers (88 [91.7%] vs. 95 [55.6%], P<0.001).[72] Rates of referral to specialty treatment were also lower at the sites that included an embedded behavioral healthcare provider (aOR=0.58 (95% CI, 0.43 to 0.78) (low SOE).[72]

No evidence was available on the impact of the incorporation-based implementation approaches on patient outcomes.

3.1.6 Findings by Clinical Area: General Behavioral Health

3.1.6.1 Characteristics of Included Studies

For more general behavioral health assessments, we included two RCTs with some concerns for bias due to patients being aware of their study assignment (lack of blinding),[63, 68] a stepped-wedge trial with high risk of bias,[59] and one nonrandomized study with high risk of bias due to confounding and missingness of data[71] (Appendix B, **Table B-4**). One of these studies assessed the implementation of a screening-only intervention using a **technology-based approach**,[71] two assessed implementation of screening with BI using a **clinician support-based approach**,[63, 68] and one assessed implementation of a stepped-care SBIRT model using an **incorporation-based approach**. **Table 8** summarizes the implementation and comparisons strategies; further details about implementation strategies used in these studies are reported in **Appendix B**.

The nonrandomized study assessing the outcomes of implementing a health risk assessment screening using a **technology-based implementation approach** during primary care visits focused on adolescents ages 14 to 18 years.[71] The health risk assessment was completed electronically via tablet and covered topics of tobacco, alcohol, and drug use as well as depression and suicide risk. Responses were aggregated into a report via the online platform to guide clinicians in their discussions with adolescents. The study involved 22 clinics in Florida (20 in the implementation group, 2 in the control group) working in collaboration with a practice-based learning network. About half of involved clinicians were family practitioners (46.3%) and about half were pediatricians (47.5%). Clinicians were in practice for a median of 9 years.

Two RCTs assessed a **clinician support-based implementation approach** to implement electronic screening for health risk behaviors among adolescents ages 13 to 18 years using the HEADSS mnemonic (Home, Education, Activities, Drugs, Depression, Sexuality, and Safety). Distributing educational materials only was compared to adding personalized feedback delivered to the patient at screening as well as a summary delivered to the provider to inform the appointment.[63, 68] Both RCTs were conducted at five pediatric clinics in the Pacific Northwest.

Lastly, the **incorporation-based implementation approach** to implement SBIRT was assessed using a stepped-wedge design with 5 phases among 59 practices with 354 primary care providers serving over 300,000 patients in Massachusetts.[59] The practices embedded behavioral health clinicians and participated in a learning collaborative to share and discuss their implementation experiences and challenges. The learning collaborative consisted of each practice's behavioral health team, which was expected to include at least one primary care provider, the clinic's medical home care coordinator, and a behavioral health clinician hired by the practice. Each practice's behavioral health team was then supported by the off-site behavioral health incorporation team. The off-site support included education, consultation on behavioral health needs, and support for care delivery by each site's behavioral health team. Most providers involved were physicians (70%), followed by nurse practitioners (29%), then physician assistants (1%). Across phases of implementation, the practices' patient panel size ranged from 3,195 to 7,765 patients (resulting in 726 to 801 patients per primary care provider).

3.1.6 Results, Key Question 1: Implementation Strategies, Findings by Clinical Area: General Behavioral Health

Table 8. Strategies[a] used in studies on general behavioral health

Author, Year Study Design and Risk of Bias	Clinical Intervention	Overarching Implementation Approach	Strategy: Evaluate & Iterate	Strategy: Interactive Assistance	Strategy: Select, Adapt, Tailor	Strategy: Develop Relationships	Strategy: Train & Educate	Strategy: Support Clinicians	Strategy: Engage Patients	Strategy: Change Infrastructure	Comparison Strategy[a]
Thompson 2016[71] (NRSI with high risk of bias)	Screening	Technology	Monitor delivery performance	Provide facilitation	Tailor based on practice and setting	N/A	Conduct educational meetings	N/A	N/A	Use technology; change physical equipment	No strategy
Richardson 2019[68] (RCT with some bias concerns)	SBI	Support clinicians	N/A	N/A	N/A	N/A	Distribute educational materials	Facilitate relay of clinical data to providers	Prepare patients to be active participants	N/A	Distribute educational materials only
Richardson 2021[63] (RCT with some bias concerns)	SBI	Support clinicians	N/A	N/A	N/A	N/A	Distribute educational materials	Facilitate relay of clinical data to providers	Prepare patients to be active participants	N/A	Distribute educational materials only
Walter 2021[59] (Stepped-wedge trial with high risk of bias)	SBIRT (stepped care)	Incorporation (with learning collaborative)	N/A	Provide clinical supervision; provide ongoing consultation	N/A	Change organizational culture	Engage in learning collaborative; conduct educational meetings	Create new clinical team; facilitate relay of clinical data to providers	N/A	N/A	No strategy

[a] Implementation strategies are defined in Appendix A, Table A-7.
N/A = not applicable; NRSI = non-randomized study of interventions; RCT = randomized controlled trial; SBI = screening and brief intervention; SBIRT = screening, brief intervention, and referral to treatment.

3.1.6.2 Overview of Potential Barriers and Facilitators

Two of the four studies reported on potential barriers and facilitators of implementation for screening[71] and SBIRT[59]. The nonrandomized study evaluating a **technology-based approach** to implementing screening reported characteristics that reflect the participating practices' infrastructure, including type of practice, patient population, and use of an electronic medical record system. Participating practices included Federally Qualified Health Centers (n=4), private practices (n=6), hospital-affiliated clinics (n=2), and academic medical centers (n=10).[71] The practices varied in the proportion of their patients who were adolescents ages 14 to 18 years, with some practices (20%) having fewer than 10 percent adolescent patients and most practices (56.7%) having 10 to 50 percent adolescent patients. Two-thirds of the practices (66.7%) had electronic medical records and not all practices used the same system. As such, the health risk assessment was Web-based so that all practices could use it, which meant that it could not be integrated into the practices' electronic medical record systems and had to be managed separately. Authors of this study but did not report whether any potential barriers or facilitators were impacted by the technology-based implementation approach or influenced outcomes.

In a stepped-wedge trial evaluating an **incorporation-based approach** to implementing SBIRT, more than half of practices (63%) ultimately hired an incorporated behavioral health counselor, which was more common among practices with three or more primary care providers (77%) than smaller practices with one to two primary care providers (13%; P<0.001).[59] Authors further reported on level of engagement in the implementation strategies but did not indicate whether engagement influenced outcomes. All practices participated in at least one learning collaborative session, but closer to one-third of primary care providers (35%) participated in at least one session. One-quarter (27%) of primary care providers earned continuing medical education credits through session attendance, completing a quality improvement project, and participating in surveys. Most practices (71%) and close to half of primary care providers (44%) leveraged the consultation services available from the off-site support team. Importantly, engagement in the implementation strategies did appear to impact provider-level factors. Most primary care providers (>90%) in the first three phases of the project self-reported that participation increased their knowledge about symptom rating scales, guided self-management, psychotropic medications, and level-of-care decisions; imparted greater confidence in their ability to manage behavioral health problems; and improved the quality of their behavioral healthcare.

3.1.6.3 Results for Implementation, Service, and Patient Outcomes

3.1.6.3.1 Technology

Findings from one nonrandomized study indicate that, compared to no strategy, a **technology-based implementation approach** may increase screening and BI for mental health concerns and for risky behavior, but the evidence is very uncertain (very low SOE).[71] Adolescents in the intervention group reported significantly higher rates of being screened for risky behaviors and for depression, mental health, emotions, and relationships, as reflected in Young Adult Health Care Survey (YAHCS). Each domain of the YAHCS could range between 0 and 1, with higher numbers indicating higher rates of screening, and scores were adjusted for sex, race/ethnicity, and age. Of note, this paper was published in 2016, when the problematic nature of controlling for race/ethnicity was less well-known. For risky behaviors, the intervention

group had a score of 0.36 (standard error [SE] 0.06) and the comparator group had a score of 0.05 (SE 0.11), which reflected a significantly higher rate of screening (p=0.03). For depression, mental health, emotions, and relationships, the intervention group had a score of 0.42 (SE 0.05) and the comparator group had a score of 0.08 (SE 0.09), which reflected a significantly higher rate of screening (p<0.01). Adolescents receiving care leveraging the **technology-based approach also** reported significantly higher scores of receiving care that was private and confidential than those in the comparator group (YAHCS: 0.85 vs. 0.57, p<0.0001).[71]

3.1.6.3.2 Clinician Support

Receipt of BI following screening was reported in the two RCTs assessing a **clinician support-based approach** to implementation.[63, 68] In both RCTs, patients receiving care from clinicians who received a summary report had a higher rate of receiving counseling for moderate- and high-risk behaviors than patients receiving care from clinicians who did not receive a summary report (proportion of patients that received counseling by arm not reported; aRR 1.32 [95% CI, 1.07 to 1.63][68] and aRR 1.36 [95% CI, 1.04 to 1.78]), suggesting that clinician support likely increases counseling (high SOE).[63] Similar results were reported in both studies when assessing receipt of counseling for moderate- and high-risk behaviors separately (although the 95% CI for the aRR for receiving counseling for high-risk behaviors reported in 1 of the studies just crossed the null: aRR 1.61, 95% CI, 0.95 to 2.73).[68]

Only one of the RCTs evaluating **clinician support** reported patient satisfaction with the well-care visit process.[63] There was no difference in satisfaction between the patients who themselves and their providers received real-time feedback and the patients who themselves and their providers did not (controlling for age, sex, and clinic; data not reported).[63]

Both RCTs reported mental health risk scores following BI.[63, 68] Across these studies, the patients who themselves and their providers received real-time feedback had a lower mean risk behavior score at 3-month followup compared the patients who themselves and their providers did not receive real-time feedback, although the pooled mean difference was not statistically significant (mean difference -0.19, 95% CI, -0.54 to 0.17; Appendix E, **Figure E-1**). These findings indicate that a clinician support-based implementation approach has little to no effect on risk behaviors at 3-month followup (high SOE). One of these studies further reported mean risk behavior scores as calculated from the adapted version of the Check Yourself tool at 6 months and again found no difference between the groups (adjusted score difference 0.12, 95% CI, -0.29 to 0.52, p=0.57).[63] This indicates that a clinician support-based implementation approach probably has little to no effect on risk behaviors at 6-month followup (moderate SOE)

3.1.6.3.3 Incorporation

Findings from a stepped-wedge trial indicated that **incorporation-based implementation approach** may increase screening rates, but the evidence is very uncertain (very low SOE). Universal behavioral health screening increased from 55.6 percent in the control period to 73.9 percent in the implementation period (aOR 1.25, 95% CI, 1.21 to 1.29; P <0.001).[59]

Regarding further followup after screening, primary care-provided behavioral health visits increased from the control to implementation period (107 visits per 1,000 patient years control vs. 177 visits during the implementation period; aOR 1.2, 95% CI, 1.1 to 1.3; P<0.001). Specialist delivered psychotherapy visits also increased from the control to implementation period (15 visits per 1,000 patient years control vs. 176 visits during the implementation period; aOR 6.7, 95% CI, 5.8 to 7.7; P<0.001); the impact on psychotherapy visits was likely largely due

to the addition of a behavioral health specialist to the clinical team. These findings indicate that an incorporation-based implementation approach may increase followup via primary care behavioral health visits (very low SOE) and may increase initiation of treatment via psychotherapy visits with a specialist (low SOE).

Between the control and implementation period, the change in guideline-congruent prescribing was statistically significant for selective serotonin reuptake inhibitors (SSRIs) (57 prescriptions per 1,000 patient years control vs 190 prescriptions during the implementation period; aRR 1.3, 95% CI 1.2 to 1.4; P<0.001) but not for attention deficit hyperactivity disorder (ADHD) medication (254 prescriptions per 1,000 patient years control vs. 362 prescriptions during the implementation period; aRR 1.01, 95% CI, 0.96 to 1.07; P=0.60). Behavioral health visits to emergency departments also did not change (visits not reported by control vs. implementation period; aRR 0.9, 95% CI, 0.8 to 1.1; P=0.46). These findings indicate that an incorporation-based implementation approach may have little to no effect on increasing guideline-congruent ADHD prescribing but may increase guideline-congruent SSRI prescribing; however, the evidence is very uncertain (very low SOE).

3.2 Contextual Question 1. Findings From Studies Conducted Outside the United States

3.2.1 Summary of Findings

3.2.1.1 Characteristics of Included Studies

We found two eligible studies conducted outside the United States.[73, 74] Both were cluster RCTs comparing different strategies for implementing screening and either BI or referral for a range of behavioral health risk factors. The first study assessed the use of a multicomponent implementation strategy versus a comparison arm receiving a single educational seminar for clinicians to improve screening and counseling for multiple psychosocial risk factors among 901 adolescents and young adults ages 14 to 24 years.[74] The study was conducted in 40 general practices in Victoria, Australia, and involved at least one interested clinician (general practitioner [GP] or nurse) at each practice. Across study groups, young patients' characteristics were generally similar, except that the implementation arm contained a higher proportion of patients ages 18 to 24 years and fewer in the post-randomization exit interview sample who were born in Australia. About 87 percent of participants in both study arms reported having at least one of the six health risk behaviors at the exit interview, with the most common being road risks and then tobacco and alcohol use in the last 12 months.

The second study assessed the incorporation of a 2.5-day training on managing common child mental health problems with SBI for GPs into an existing adult collaborative care program in Tehran, Iran.[73] A total of 49 GPs caring for 389 children ages 5 to 15 years (regardless of their reasons for seeking care) were enrolled in the study. Child participants seeing implementation and control GPs had similar characteristics. About 18 percent had seen a mental health professional in the 6 months prior to screening. Parents (most of whom were mothers) who saw implementation and control GPs were similar, and most had seen the participating GP at least once previously. **Table 9** summarizes the implementation and comparison strategies.

3.2.1 Results, Contextual Question 1: Findings From Studies Conducted Outside the United States, Summary of Findings

Table 9. Strategies[a] used in non-U.S. studies

Author, Year Study Design	Clinical Intervention	Overarching Implementation Approach	Strategy: Evaluate & Iterate	Strategy: Interactive Assistance	Strategy: Select, Adapt, Tailor	Strategy: Develop Relationships	Strategy: Train & Educate	Strategy: Support Clinicians	Strategy: Engage Patients	Strategy: Change Infrastructure	Comparison Strategy[a]
Sanci, 2015[74] (RCT)	Screening	Clinican training	Obtain and use patient and family feedback	Provide facilitation	N/A	N/A	Make training dynamic Distribute educational materials	N/A	N/A	N/A	Conduct educational meeting
Sharifi, 2023[73] (RCT)	Screening	Clinican training	N/A	N/A	N/A	N/A	Make training dynamic	N/A	N/A	N/A	Conduct educational meeting

[a] Implementation strategies are defined in Appendix A, Table A-7.
N/A = not applicable; RCT = randomized controlled trial.

3.2.1.2 Overview of Potential Barriers and Facilitators

Both RCTs reported practice- and provider-level characteristics, but neither reported whether the implementation strategies had any impact on them or subsequent outcomes. In the Australian RCT, practices receiving a more dynamic **clinician training** strategy tended to be smaller than practices receiving a more basic training.[74] Compared with Australia's general practices, the study sample contained a larger proportion of urban practices (80% vs. 72%, respectively) and a smaller proportion of solo practices (15% vs. 21%, respectively). Clinicians had similar characteristics across arms. About 60 percent of GPs in both arms had previous training in young people's health, but more nurses receiving the dynamic training reported previous training. Only implementation arm clinicians were asked to document their method of screening—that is, whether they used the study-designed paper or electronic screening tool provided during implementation training, the alternative of a verbal screening recommended by the implementation team and based on the HEADSS, or another tool—in encounter forms. They completed this task for most (75%) of their recruitment consultations with patients. The study-designed screening tool was used in 30 percent of consultations in clinics adopting the tool, while in 43 percent of consultations with young people, these clinicians used the HEADSS verbal screening approach to identify health risks. It is unclear whether the remaining 25 percent of clinicians actually screened their patients during recruitment consultations.

Practices in the Iranian RCT shared similar characteristics, but GPs in the implementation arm were more often female than in the comparator arm (54% vs. 22%, respectively).[73] Most providers worked in solo practices, except for two GPs who worked at the same site during nonoverlapping shifts.

3.2.1.3 Results for Implementation, Service, and Patient Outcomes

Only one of two non-U.S. RCTs evaluating a **clinician training** approach measured fidelity to the implementation strategy.[74] Implementation arm clinicians had more discussions with young people about their health risks than control clinicians (60% vs. 53%, respectively) and were more likely to discuss a greater number of health risks with each person.

Only the Iranian RCT reported on service outcomes.[73] It found that implementation arm and control GPs identified similar proportions of children and adolescents as having a treatable mental health problem (59% vs. 51%, respectively), but that implementation arm GPs were more likely to report actually counseling the family about a child mental health problem (odds ratio [OR] =1.8; 95% CI, 1.02 to 3.30, adjusted for clustering within GP and allocation variables). Compared with control GPs, more implementation arm GPs also referred children with mental health problems, and fewer reported prescribing medication, although these differences were not statistically significant. Children and youth seeing an implementation arm GP had a threefold increased odds of seeing a mental health professional during the study than children seeing a control GP (OR=3.0; 95% CI, 1.1 to 7.7).

Both RCTs evaluating a **clinician training** approach measured mental health outcomes.[73, 74] The Australian RCT used multivariate adjusted analyses and found that implementation arm clinicians had a significantly greater odds of detecting at least one risk-taking behavior than control clinicians at the study's exit interview (i.e., immediately post-consultation with a participating clinician) in the cohort sample (N=901) (OR=1.65; 95% CI, 1.11 to 2.46), and more specifically, alcohol use (OR=2.29; 95% CI, 1.25 to 4.20), and fear or abuse in relationships (OR=13.8; 95% CI, 1.71 to 111).[74] Odds of identifying health risks among young people at 3 and 12 months post-implementation differed between groups after accounting for missing data with

multiple imputation. Compared with control patients, implementation arm patients had significantly lower odds of endorsing past-month illicit drug use at 3 months (OR=0.52; 95% CI: 0.28 to 0.96) and 12 months (OR=0.40; 95% CI: 0.20 to 0.80) post-implementation strategy. In the Iranian RCT, parent-reported child mental health problems as measured by Strengths and Difficulties Questionnaire total scores improved in both groups over time but did not differ between groups at 3- or 6-month followup.[73]

The Iranian study also did not find any significant between-group findings for any of the service or mental health outcomes it reported among subgroups based on children's age or sex.[73]

4. Discussion

The aim of this review was to assess the effectiveness and risk for harms of implementation strategies for mental health and substance use screening and counseling in primary care as recommended by the U.S. Preventive Services Task Force and Bright Futures Periodicity Schedule.

4.1 Summary of Results

The studies included in this review assessed a number of overarching implementation approaches, including engaging clinical teams in learning collaboratives, providing support for clinicians, providing technological assistance, and adding new team members to incorporate behavioral health into primary care.

As shown in the evidence map (**Table 4**), the size and direction of effect and strength of evidence varied across the approaches and clinical areas of interest. Compared to clinical interventions that involved minimal or no implementation approaches, the use of implementation strategies consistently led to higher screening rates, responses to a positive screen, and a greater initiation of treatments. Studies comparing different types of implementation approaches reported comparable effectiveness with occasional exceptions in individual outcomes.

Engaging in learning collaboratives increased screening rates for depression and eating disorders.[60, 67, 70] Support for clinicians resulted in higher depression screening rates and more frequent brief interventions (BIs).[58] Integrating behavioral health into primary care settings enhanced screening for general behavioral health risks and facilitated the initiation of treatment.[59] Additionally, leveraging technology increased screening for risky behavior and mental health concerns.[71] The underlying evidence is mostly very uncertain and findings have to be interpreted cautiously.

When clinician support was employed as an implementation approach, evidence of moderate or low strength indicates that it neither reduced risk behaviors [63, 68] nor led to an increase in referrals for specialty substance use treatment,[72] compared with the distribution of educational materials or the absence of any implementation strategy, suggesting that improved screening may not translate to improved health outcomes.

Studies comparing different types of implementation strategies reported comparable effectiveness with occasional exceptions in individual outcomes. Evidence of high or moderate strength demonstrated that clinician support and behavioral health incorporation had comparable effectiveness in enhancing screening and brief advice.[65] BIs for substance use, however, were utilized more frequently with clinician support than behavioral health incorporation.[65] Evidence of moderate strength found that time to alcohol and cannabis use was comparable when employing clinician support with reminders or leveraging technology without reminders as implementations strategies.[69] An exception was time to alcohol or cannabis use among high-risk patients, which was more likely to be longer among youth in the arm that included clinician support and reminders.[69]

Although the addition of behavioral health incorporation to clinician support did not result in an increase in screening, it increased the frequency of BIs while simultaneously reducing referrals to specialty treatments.[72] These findings are based on evidence of high or moderate strength.

Interestingly, we also identified instances where the study results favored the comparator group, rather than the implementation approach, though these could potentially be attributed to

chance findings. A learning collaborative approach resulted in more depression screenings but fewer responses to a positive screen compared to no implementation strategy.[67] This suggests that increased screening may detect more cases but may also lead to some screen-detected cases not being addressed once they are detected. In one study assessing behavioral health incorporation compared with clinician support for addressing substance use, the behavioral health incorporation group had less BI than the clinician support group.[61, 62, 65, 66] The authors hypothesized that clinicians preferred to offer BI themselves rather than take the extra step to contact the behavioral health support in a clinic. For substance use, a combination of clinician support and behavioral health incorporation led to fewer appropriate referrals to specialty treatment than clinician support alone.[72] The study authors raised concerns that primary care practitioners felt that any responsibility for addressing substance use ended when they made the referral to the incorporated behavioral health clinician, reducing referrals for patients whose severity of substance use merited referral to specialty care.

While fidelity was not graded because it was not considered as critical for decision making by the Technical Expert Panel, studies assessing fidelity reported that implementation strategies seemed to lead to improvement in fidelity to the intervention. A clinician support-based approach improved fidelity to second stage screening for depression,[58] and a learning collaborative increased the use of a validated tool for screening for depression.[67]

4.2 Evidence Gaps

We noted several conditions for which there was either no information or very little information available. Although our review identified three studies on screening for depression and suicide risk among children and adolescents; one on screening for eating disorders, one on tobacco, alcohol, and drug use assessment; three on counseling on alcohol, tobacco, and unhealthy and illicit drug use; and four studies on implementation of general behavioral health screening, it did not identify any studies on implementation of screening for anxiety among children and adolescents or maternal depression among teenage mothers, which were also of interest for this review.

In addition to certain topic gaps, we noted that certain age groups have less evidence than others. Many of the included studies focused on adolescents and older children, but none focused on young children. The Bright Futures Periodicity Schedule recommends general social, behavioral, and emotional screening for this age group, and so it was considered as a potentially eligible topic for this review, but we were not able to identify studies meeting our inclusion criteria that addressed this topic.

From the limited evidence available, several of the 10 priority outcomes for this review had either very little or no evidence (see the evidence map, **Table 4**). None of the included studies assessed the acceptability or feasibility of the clinical intervention nor were patients' functional outcomes, quality of life, or adverse events assessed. Only one study assessing implementation of depression screening assessed equity.[58] Two studies (one focused screening for depression[60] and one on screening and counseling for substance use[65]) assessed sustainability. This limits our ability to globally understand the extent to which the implementation approaches evaluated are effective in achieving key implementation and patient outcomes. The lack of data on whether gains resulting from the approaches are sustained is particularly concerning, as it remains unclear what long-term effects these implementation efforts are having.

Efforts to address these gaps are underway. The American Academy of Pediatrics, through its Pediatric Research in Office Settings network is currently assessing computer-based screening

for alcohol use among adolescents in primary care settings in a randomized controlled trial. We anticipate that this and other similar work will address the identified gaps in this report.[75]

4.3 Implications for Practice

The combination of limited evidence and lack of certainty about the available evidence in some areas impedes our ability to provide a clear response to the decisional dilemmas that this report was intended to address. Primary care offices have many factors to consider when determining how best to implement screening and counseling for mental health and substance use disorders. The findings here are not conclusive, and thus are unable to provide a clear path for implementation of this important work.

That being said, the studies included in this report did generally find an increase in screening for mental health and substance use disorders with the implementation approaches described, which is consistent with similar quality improvement work that was not included in the report due to not meeting the inclusion criteria for study design.[76-78] Additionally, our inclusion criteria focusing on studies in the United States using implementation strategies to incorporate screening and mental health interventions into primary care make the included papers highly applicable to primary care settings. So, although not definitive, clinicians seeking to incorporate screening for mental health and substance use disorders could consider looking at the available implementation studies identified here and published quality improvement work for guidance while the evidence base grows.

The implementation approaches and strategies identified in this report seem to be designed to acknowledge the heavy demand placed on primary care providers and clinics. Primary care providers face numerous barriers to addressing mental health and substance use disorders in primary care, including lack of training in mental health conditions and substance use disorders, lack of time, poor reimbursement of mental health and substance use screenings, and lack of appropriate resources to support clinicians in the setting of a positive response to a screen.[31] Outside support may help increase screenings and initiation of treatment, though more evidence is needed. As noted above, providing outside help to clinicians and clinics was a key component of many of the included studies. The outside help took many forms, such as engaging participating providers and practices in learning collaboratives and supporting clinicians, which were noted to be common overarching implementation approaches. Specific strategies also sought to help primary care providers and clinics in the form of providing clinical data to providers, offering practice facilitation and supervision, and providing reminders to clinicians.

Much of the leadership for these implementation approaches came from entities outside individual practices that worked in collaboration with the included practices/clinicians, suggesting that the execution of implementation approaches aimed at supporting clinicians (such as learning collaboratives) is beyond the capacity of a single primary care practice and likely falls under the purview of larger organizations, like state/regional chapters of professional societies, state-based collaboratives, accountable care organizations, or practice-based networks. Within implementation science, the organizations leading such efforts are known as "intermediary/purveyor organizations (IPOs)."[79] IPOs are positioned to provide the technical assistance, clinical data outputs, and other outside help that was frequently present in the studies included in this review.

Another important note is that, even with help, the effort required from the primary care providers themselves for participation in the implementation efforts found in this review was at times significant. For example, a learning collaborative to implement screening for depression

included a formal quality improvement project for each of the participating practices as well as attendance at least three of six all-practice calls held over 7 months.[67] With time already limited for primary care providers, such extra efforts may not always be feasible and may be a function of the incentives of study participation. Similarly, incentives such as resources for the office and providing continuing medical education or maintenance of certification credits may boost participation in these efforts, but those seeking to support primary care clinics as they build in efforts for screening and counseling of mental health and substance use disorders will need to be mindful of what they are asking the individuals in those clinics to contribute.

In particular, efforts to support primary care providers as they increase screening and counseling for mental health and substance use disorders should take the time to confirm with primary care providers that the efforts are acceptable to them, a noted gap of this review. Although certain types of reminders and feedback have been shown to improve adherence to guidelines and improve care across a range of settings and conditions,[80] reminders and alert fatigue are also contributors to clinician burnout.[81, 82] The data suggest that there is a fine line between a helpful reminder to boost adherence to guidelines and giving so many reminders to primary care providers that the "help" in fact becomes a burden.

The studies with findings that favored the comparator strategy also have some important implications for practice. More screening will lead to more cases being detected, and thus it may be easier for a case to be missed, as was noted in a study of screening for depression in this review.[67] Practices will need to consider the adequacy of the mechanisms they have in place to address a positive response to a screening test. The findings from studies that incorporated behavioral health support into the practice also had findings favoring the comparator strategy, with behavioral support leading to less BI when compared to clinician support in one study[61, 62, 65, 66] and fewer referrals to specialty treatment when compared with clinician support alone in another.[72] Whether this is desirable or not depends on a practice's intent when incorporating a behavioral health clinician into their practice. Perhaps a practice intends to reduce the need for referrals and address more mental health and substance use disorders within primary care. In this case, the decreased need for additional intervention is the preferred effect. In other cases, the aim of the incorporated behavioral health support is to boost use of specialty care by having an embedded behavioral health clinician build rapport and trust and thus motivate children, adolescents, and their families to connect to necessary specialty care. Those seeking to incorporate behavioral health support into primary care will need to consider the intended aims of such support before implementing such a change to ensure that the support is meeting its goals.

4.4 Limitations of the Evidence

Our final yield of publications was small, at just 15 papers from 11 studies. This small number of studies was in part the result of excluding pre-post studies that lacked a control group, which also resulted in the exclusion of quality improvement studies that used statistical process control charts. Statistical process control charts are commonly used to monitor process or outcome measures, but they can also be used to draw inferences about effectiveness if specific methodological requirements are met. The most crucial of these is the need for a stable baseline before implementing the intervention, which allows for accurate measurement of outcome improvements post-intervention. Methods studies recommend 20 to 25 data points for statistical process control charts to establish a stable baseline.[83] Quality improvement studies that do not meet these methodological standards are insufficient for drawing conclusions about the

effectiveness of interventions, as they cannot adequately control for time trends.[84] In our review, none of the excluded quality improvement studies using process control charts came close to meeting these methodological requirements. Further, these studies did not leverage substantively different implementation approaches than the ones highlighted in this report (e.g., one used a "clinician support" strategy for relaying real-time information to providers[77] and another used a "technology-based" strategy for integrating screening questions into an electronic health record[78]). These studies, however, can still offer valuable insights through Plan-Do-Study-Act cycles and formative evaluation to refine implementation.

Although the inclusion of pre-post or quality improvement studies would have resulted in a greater volume of evidence, the lack of methodological rigor limits the quality of the evidence and the ability to draw conclusions. Thus, the addition of such papers to the review would have still resulted in low or very low strength of evidence.

We did supplement the review with an assessment of literature from other countries, which ultimately yielded two studies.[73, 74] Given the small number of studies, the findings from these international studies did not change our overall conclusions.

Additionally, we did not identify other reviews that specifically looked at the implementation of screening and counseling for mental health and substance use disorders among children in primary care, so we are not able to compare the current findings to a review looking at the same topic. However, several reviews assessing the evidence around the implementation of other aspects of mental healthcare have been conducted. One review focused on implementation of mental health treatment (as opposed to screening/counseling) for children and adolescents and found 19 studies.[85] They determined with moderate certainty that financial incentives improved provider adherence to evidence-based practice. Their other findings were either of low certainty or had insufficient evidence to draw conclusions. A scoping review assessed various aspects of incorporation of behavioral health services into pediatric primary care, again with a focus on treatment for mental health conditions.[86] They determined that incorporation was generally acceptable to patients, parents, and primary care offices, but noted that the effects of incorporation on screening rates had not been assessed in a randomized controlled trial at the time of the publication of the review. Another systematic review found that behavioral health incorporation to address pediatric mental health needs appeared to work well in research settings, but noted a lack of data on the translation of behavioral health incorporation to more real-world settings and called for further data on dissemination and implementation.[87] Several reviews looked at screening and counseling for children, adolescents, and young adults in other settings, including school settings[88] or using internet-[89] and app-based tools.[90] These reviews identified many barriers to implementation of screening in these other settings, including concerns about time and cost, problems obtaining consent and following up on positive results, and difficulties with translation to the real-world due to the slow pace of research findings. The identified reviews demonstrate that understanding how to successfully implement mental healthcare and treatment for substance use disorders is limited across the care continuum, regardless of setting.

Inequities in mental healthcare and substance use treatment access with respect to race, sex, and other characteristics have been well-documented.[12] Implementation of screening and counseling for mental health and substance use disorders in primary care has the potential to mitigate these inequities, but this review found little data to indicate whether the strategies are in fact successful in this regard.

The available data regarding the impact of these implementation approaches on referrals from primary care to specialty mental healthcare is unclear. One study found that clinician

support made no difference in the number of referrals compared to usual care, but that same study did find that behavioral health incorporation resulted in fewer referrals to specialty care compared to clinician support.[72] Interpretation of these mixed results is further complicated by the additional nuance that the intended direction of effect may vary depending upon the intervention and the implementation approach. There is the possibility that increased screening will lead to increased recognition and thus more referrals. Conversely, the inclusion of behavioral health support within a primary care setting may be intended to reduce the need for referrals or limit referrals only to those patients whose symptoms cannot be managed in primary care. Thus, this review is limited by both a paucity of evidence regarding referrals and the additional challenge that implementation approaches may be aiming for increased or decreased number of referrals depending on what is involved.

Publication and outcome reporting bias present inherent limitations for any systematic review. Despite our extensive searches for both published and unpublished literature, it remains impossible to ascertain the completeness of our coverage, particularly regarding studies that remain unpublished.

4.5 Limitations of Our Process

The synthesis of implementation science is, by its nature, more complex than the synthesis of other types of research. It must consider both the clinical intervention of interest—in this case, screening and counseling for mental health and substance use disorders—as well as the implementation approach utilized to increase uptake of the clinical intervention. The implementation approach is often multifaceted and multiple outcomes across multiple domains are often assessed. Our team included implementation science experts, experts in evidence synthesis, and a practicing primary care physician with research experience, all of whom were consulted regularly to ensure consistent application of inclusion criteria and data abstraction procedures in a manner that would be of utility to practicing primary care clinicians. Nonetheless, individualized judgments were required throughout the process. We have aimed to be transparent about where these judgments occurred but acknowledge that different people may have made different decisions. One specific example is our treatment of screening and BI (SBI) and screening, brief intervention and referral to treatment (SBIRT) studies. We spent significant time and discussion attempting to determine whether SBI or SBIRT should be considered an implementation approach or an intervention. Because SBIRT has primarily been evaluated as a tool specific to SBI for substance use/misuse, we opted to treat SBIRT as an intervention. Thus, our included SBIRT studies were seeking to use an implementation approach (such as a learning collaborative) to implement SBIRT in primary care and any studies explicitly testing SBIRT without any additional implementation strategy were excluded. As the aim of this review was on implementation in primary care, this decision seemed appropriate. It is also a noteworthy limitation of the review, and one that may need to be reconsidered in future similar reviews, particularly if SBIRT continues to be translated to other conditions.

Another limitation of this process is the requirement that studies have a clear description of both the clinical intervention, such as screening for depression or brief counseling about substance use, and the implementation strategy, like a learning collaborative. Having both of these inclusion criteria allowed us to align previously published literature with the available implementation frameworks. We found several instances where papers were not published with an implementation framework in mind. In some instances, we were able to collectively agree that there was enough description of an implementation strategy in the paper that the paper could be

included in this report.[60, 71] In other cases, after extensive discussion among the study team, the decision was made that the paper could not be included due to lack of alignment with the inclusion and exclusion criteria, particularly due to insufficient description of the implementation strategy.[91, 92] So, some papers with a clear focus on improving screening and treatment of pediatric mental health and substance use disorders were excluded for this reason. The aim of this review was to guide pediatric practitioners in strategies to implement this important aspect of care into their practice, and so we kept a clear focus on implementation, which may have resulted in some studies with a tangential focus on implementation being excluded.

4.6 Future Research Directions

As we noted, many of the interventions in this review are multifaceted, providing training, infrastructure, and behavioral health incorporation to support primary care clinics in addressing mental health and substance use screening and counseling. Future research might want to consider testing similar multifaceted interventions to ensure that primary care physicians have adequate resources in place to complete screening and counseling for mental health and substance use disorders. Additionally, because of the significant workload for primary care clinics to add screening and counseling for mental health and substance use disorders to their workflow, it is important to ensure that the implementation results in better health for the patients and not just increased work for the primary care clinicians. Future work should continue to monitor for improvement in health among patients.

Additional research is also needed to address the evidence gaps noted in this report, such as implementation of screening for anxiety, screening for postpartum depression in adolescent mothers, general social/emotional screening for young children, and the outcomes gaps noted, including those for acceptability and sustainability.

Another area for future research is assessment of implementation of screening and counseling for mental health and substance use disorders in primary care to address known health disparities in this area. Future work could consider stratifying analysis by race and/or other patient characteristics to assess the impact of the implementation approaches on equity of care for disadvantaged groups. Implementation targeted toward children and adolescents living in low-income neighborhoods and/or children and adolescents on Medicaid would also help to improve the understanding of which implementation approaches may be better suited to addressing inequities due to differences in socioeconomic status.

The available evidence suggests areas where certain implementation strategies may have no benefit or where different strategies may have significantly different results. Comparative studies to assess different implementation approaches to identify which is more effective may help to determine how primary care clinics can best use limited resources and/or may see significant benefit from a large investment.

Much of the implementation work was led by IPOs, organizations that provide supports to help primary care clinics complete their work. It is possible that future work will be more definitive about the importance of support for clinicians and interactive assistance in implementing screening and counseling for mental health conditions and substance use disorders in primary care. If that should prove to be the case, then additional work will be needed to understand not only best practices within the clinics but also best practices for IPOs.

We allowed for the inclusion of interrupted times series (ITS), though only one study using this approach was ultimately included.[60] Statistical process control charts from quality improvement work may be able to be analyzed as ITS, if done over a sufficiently long time

course.[93] Those leading quality improvement work are encouraged to leverage their ongoing efforts and document sufficient data to enable ITS analysis, as this would provide quality evidence and enhance future efforts to understand the impacts of more discrete implementation strategies on improving implementation of screening and counseling for mental health and substance use disorders.

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Abbreviations and Acronyms

ADHD = attention deficit hyperactivity disorder
AHRQ = Agency for Healthcare Research and Quality
AI = artificial intelligence
aOR = adjusted odds ratio
aRR = adjusted risk ratio
BI = brief intervention
BMI = body mass index
CI = confidence interval
COMET = Core Outcome Measures in Effectiveness Trials
CRAFFT = Car, Relax, Alone, Forget, Friends, and Trouble (screening tool for substance-related risks and problems)
CQ = Contextual Question
EHR = electronic health record
EPC = Evidence-based Practice Center
EPOC = Effective Practice and Organisation of Care
ERIC = Expert Recommendations for Implementing Change
GP = general practitioner
GRADE = Grading of Recommendations Assessment, Development and Evaluation
HEADSS = Home, Education, Activities, Drugs, Depression, Sexuality, and Safety
HR = hazard ratio
I^2 = I-squared (measure of statistical heterogeneity)
IPO = intermediary/purveyor organization
ITS = interrupted time series
KI = Key Informant
KQ = Key Question
MeSH = Medical Subject Headings
NRSI = non-randomized study of interventions
PHQ-9 = Patient Health Questionnaire-9
PICOTS = population, interventions, comparators, outcomes, timing, and setting
PRISMA = Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PSC-17 = Pediatric Symptom Checklist-17
QCA = Qualitative Comparative Analysis
QI = quality improvement
RCT = randomized controlled trial
RoB 2 = Cochrane Risk of Bias 2

RoB 2 CRT = RoB 2 extension for cluster-randomized parallel-group trials
ROBINS-I = Risk Of Bias In Non-randomized Studies of Interventions
SBI = screening and brief intervention
SBIRT = screening, brief intervention, and referral to treatment
SE = standard error
SOE = strength of evidence
SSRI = selective serotonin reuptake inhibitor
TEP = Technical Expert Panel
TOO = Task Order Officer
TWCQ = Teen Well Check Questionnaire
USPSTF = U.S. Preventive Services Task Force
YAHCS = Young Adult Health Care Survey

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Appendix A. Methods

Details of Study Selection

Search Strategy

Our Evidence-based Practice Center (EPC) librarian searched for studies published from January 1, 2010, through July 26, 2024. Database search strings are included in **Table A-1, Table A-2, Table A-3, and Table A-4**. We conducted quality checks to ensure that known studies were identified by the search. We selected 2010 as the starting date for the literature searches because implementation strategies for preventive behavioral and mental health services have evolved significantly over the past decade. These changes were driven by factors such as efforts to integrate preventive mental health services in primary care, the advance of telehealth and digital technologies, and the recognition of the unique needs of underprivileged and diverse populations. Furthermore, in 2010 the Patient Protection and Affordable Care Act was signed into law, which had a major impact on preventive healthcare in the United States. Limiting our search to studies published after 2010 ensures that the captured literature represents the policy, cultural, and socioeconomic contexts of the current healthcare landscape in the United States.

To avoid retrieval bias, we conducted supplementary searches in reference lists of landmark studies and relevant reviews, editorials, and commentaries on this topic to look for any relevant citations that might have been missed by electronic searches (**Table A-1, Table A-2, Table A-3, Table A-4**).

Database Search Strings

Table A-1. PubMed, July 26, 2024

Search	Query	Results
#1	"Mental Disorders"[Mesh] OR "Substance-Related Disorders"[Mesh] OR "Mental Health"[Majr] OR "Mental Health Services"[Majr] OR "Community Mental Health Services"[Mesh] OR "School Mental Health Services"[Mesh] OR "Social Behavior Disorders"[Mesh] OR "mental disorder*"[tiab] OR "mental health services"[tiab:~1] OR "substance abuse"[tiab:~1]	1,566,842
#2	"Adjustment Disorders"[tw] OR Anorexia[tw] OR Anorexic*[tw] OR "Antisocial Personality"[tw] OR "behavior disorder*"[tw] OR "behaviour disorder"[tw] OR "behavioral health"[tw] OR "behavioural health"[tw] OR Bipolar[tw] OR "Borderline Personality"[tw] OR "Capgras Syndrome"[tw] OR "Compulsive Personality"[tw] OR "Conversion Disorder"[tw] OR Cyclothymic[tw] OR cyclothymia[tw] OR Delir*[tw] OR "Dependent Personality"[tw] OR ((Disruptive[tw] OR "Impulse Control"[tw] OR impulsive*[tw]) AND ("Conduct Disorder"[tw] OR "Conduct Disorders" OR behavior[tw] OR behaviors[tw] OR behaviour[tw] OR behaviours[tw])) OR dissociative[tw] OR dissociation[tw] OR Dyssomnia*[tw] OR "Emotional disorder"[tw] OR "Emotional disorders"[tw] OR "Emotion Disorder"[tw] OR "Emotion disorders"[tw] OR Exhibitionis*[tw] OR "Factitious Disorders"[tw] OR "Food Addiction"[tw] OR "Gender Dysphoria"[tw] OR "Histrionic Personality"[tw] OR Hypochondriasis[tw] OR hypochondriac*[tw] OR hypochondria[tw] OR Masochis*[tw] OR "Mood Disorders"[tw] OR "mood disorder"[tw] OR Mutism[tw] OR mute[tw] OR mutes[tw] OR "Obsessive-Compulsive Disorder"[tw] OR "Orthorexia Nervosa"[tw] OR "Panic Disorder"[tw] OR "Paranoid Personality"[tw] OR paranoi*[tw] OR "Paraphilic Disorders"[tw] OR Parasomnia*[tw] OR "Passive-Aggressive Personality"[tw] OR "Personality Disorder"[tw] OR "Phobic Disorders"[tw] OR phobia*[tw] OR "Reactive Attachment"[tw] OR (Relationship[tw] AND disturbances[tw]) OR Rumination[tw] OR Sadis*[tw] OR "Schizoid Personality"[tw] OR "Schizotypal Personality"[tw] OR "Sexual and Gender Disorders"[tw] OR "Sleep Wake Disorders"[tw] OR "social anxiety disorder"[tw] OR ("social behavior"[tw] AND disorder[tw]) OR ("social behaviour"[tw] AND disorder[tw]) OR "Somatoform Disorders"[tw] OR Voyeuris*[tw]	535,991

Search	Query	Results
#3	#1 OR #2	1,808,866
#4	Newborn[Mesh] OR Infant[Mesh] OR Preschool Child[Mesh] OR Child[Mesh] OR Adolescent[Mesh] OR adolescen*[tiab] OR boys[tiab] OR child[tiab] OR children*[tiab] OR childhood[tiab] OR girls[tiab] OR infant*[tiab] OR juvenile*[tiab] OR kindergarten*[tiab] OR neonat*[tiab] OR newborn*[tiab] OR pediatric*[tiab] OR paediatric*[tiab] OR "pre-school"[tiab:~1] OR "pre-schooler"[tiab:~1] OR "pre-schoolers"[tiab:~1] OR preschool*[tiab] OR "school-age*"[tiab] OR "school age*"[tiab] OR teen[tiab] OR teens[tiab] OR teenage*[tiab] OR youth*[tiab]	4,793,417
#5	#3 AND #4	470,136
#6	"Anxiety Disorders"[Mesh] OR "Anxiety"[Mesh] OR agoraphobia OR anxiety[ti] OR "generalized anxiety disorder"[tiab:~1] OR mutism[tiab] OR "panic disorder"[tiab:~1] OR phobia*[tiab] OR "separation anxiety"[tiab:~1] OR "social anxiety"[tiab:~1]	214,050
#7	Child[Mesh] OR Adolescent[Mesh] OR adolescen*[tiab] OR boys[tiab] OR child[tiab] OR children*[tiab] OR childhood[tiab] OR girls[tiab] OR juvenile*[tiab] OR pediatric*[tiab] OR paediatric*[tiab] OR teen[tiab] OR teens[tiab] OR teenage*[tiab] OR youth*[tiab]	4,075,902
#8	#6 AND #7	63,227
#9	"Substance-Related Disorders"[Mesh] OR "substance disorder"[tiab:~1] OR "substance disorders"[tiab:~1] OR "substance abuse"[tiab:~1] OR "substance use"[tiab:~1] OR "drug abuse"[tiab:~1] OR "Amphetamine Disorders"[tiab:~1] OR "Amphetamine Disorder"[tiab:~1] OR "Cocaine Disorders"[tiab:~1] OR "Cocaine Disorder"[tiab:~1] OR Inhalant*[tiab] OR Marijuana[tiab] OR "Narcotic-Related Disorders"[tiab:~1] OR "Narcotic-Related Disorder"[tiab:~1] OR "Neonatal Abstinence Syndrome"[tiab:~1] OR "Phencyclidine Abuse"[tiab:~1] OR "Substance Withdrawal Syndrome"[tiab:~1]	364,311
#10	"Tobacco Use"[Mesh] OR "Tobacco, Smokeless"[Mesh] OR "Tobacco Use Disorder"[Mesh] OR "Tobacco Smoking"[Mesh] OR "Tobacco Use Cessation"[Mesh] OR "Tobacco Use Cessation Devices"[Mesh] OR "Tobacco Use"[tiab:~1] OR tobacco[tiab] OR cigarette*[tiab] OR smoking[tiab] OR smoker*[tiab] OR vaping[tiab] OR vape*[tiab]	391,339
#11	"Alcohol-Related Disorders"[Mesh] OR Alcoholics[Mesh] OR "Alcoholism"[Mesh] OR "Alcohol Drinking" [MeSH] OR "alcohol abuse"[tiab:~1] OR "alcohol addiction*"[tiab] OR "alcohol consumption"[tiab:~1] OR "alcohol depend*"[tiab] OR "alcohol misuse"[tiab:~1] OR "alcohol problem*"[tiab] OR "alcohol use"[tiab:~1] OR alcoholism[tiab] OR "alcohol use disorder*"[tiab] OR ((drinking[tiab] OR drinker[tiab] OR drinkers[tiab]) AND alcohol*[tiab]) OR "harmful alcohol*"[tiab] OR "harmful drink*"[tiab] OR "problem drink*"[tiab]	248,770
#12	#9 OR #10 OR #11	792,933
#13	#12 AND #7	171,448
#14	"Depressive Disorder"[MeSH] OR "Depressive Disorder, Major"[MeSH] OR Depression[MeSH] OR depress*[tiab] OR depression[Title/Abstract] OR depressive[tiab] OR depressed[tiab] OR "Dysthymic Disorder"[Mesh] OR dysthymia[tiab] OR dysthymic[tiab] OR "Persistent Depressive Disorder"[tiab:~1] OR "Suicide"[Mesh] OR "Suicide, Attempted"[Mesh] OR "Suicide, Completed"[Mesh] OR "Suicidal Ideation"[Mesh] OR parasuicid*[tiab] OR "self harm"[tiab:~1] OR "Self-Injurious Behavior"[Mesh] OR suicid*[tiab]	708,120
#15	Child[Mesh] OR Adolescent[Mesh] OR adolescen*[tiab] OR boys[tiab] OR child[tiab] OR children*[tiab] OR childhood[tiab] OR girls[tiab] OR pediatric*[tiab] OR paediatric*[tiab] OR teen[tiab] OR teens[tiab] OR teenage*[tiab] OR youth*[tiab]	4,018,293
#16	#14 AND #15	147,959
#17	#5 OR #8 OR #13 OR #16	630,920
#18	"Ask Suicide-Screening Questions"[tiab:~1] OR ASQ[tiab] OR "Columbia-Suicide Severity Rating Scale"[tiab:~1] OR "C-SSRS"[tiab] OR "Patient Safety Screener"[tiab:~1] OR "PSS-3"[tiab] OR "PHQ-2"[tiab] OR "PHQ-9 Modified Teens"[tiab:~2] OR "PHQ-A"[tiab] OR "PHQ-9"[tiab]	8,962
#19	"Alcohol Screening Brief Intervention Youth"[tiab:~2] OR "Brief Screener Alcohol Tobacco other Drugs"[tiab:~3] OR "BSTAD"[tiab] OR "Car Relax Alone Forget Friends Trouble"[tiab:~2] OR CRAFFT[tiab] OR "Screening Brief Intervention"[tiab:~2] OR S2BI[tiab]	1,384
#20	"Pediatric Symptom Checklist"[tiab:~1]	227
#21	#18 OR #19 OR #20	10,563

Search	Query	Results
#22	"Mass Screening"[Mesh] OR "Motivational Interviewing"[Mesh] OR "Risk Assessment"[Mesh] OR "risk assessment"[tiab:~1] OR "risk assess*"[All Fields] OR screen[tiab] OR screening[tiab] OR screened[tiab] OR screens[tiab] OR screenings[tiab] OR "brief intervention"[tiab:~1] OR "brief interventions"[tiab:~1] OR "preventive care"[tiab:~1] OR "preventive intervention"[tiab:~1] OR "preventive interventions"[tiab:~1] OR "preventive behavioral health"[tiab:~1] OR "preventive mental health"[tiab:~1] OR "preventive psychosocial"[tiab:~1] OR "recommended intervention*"[tiab]	1,416,447
#23	"Counseling"[Mesh] OR counseling[tiab] OR counselling[tiab] OR counsel[tiab] OR counseled[tiab] OR counselled[tiab] OR counsels[tiab] OR "motivational interviewing"[tiab:~1]	158,171
#24	#21 OR #22 OR #23	1,553,505
#25	#17 AND #24	65,045
#26	"Community Health Planning"[mesh] OR "Health Plan Implementation"[Mesh] OR "Implementation Science"[Mesh] OR "implementation science"[tiab:~1] OR "implementation strategy"[tiab:~2] OR "implementation strategies"[tiab:~2] OR "implementation research"[tiab:~2] OR "implementation model*"[tiab] OR "implementation framework*"[tiab] OR Implement[ti] OR Implements[ti] OR Implemented[ti] OR Implementation[ti] OR Implement*[ti] OR acceptability[tiab] OR acceptable[tiab] OR Actionable[tiab] OR Actionability[tiab] OR "Adoption"[Mesh] OR adoption[tiab] OR adopt*[title] OR reach[ti] OR access[ti] OR acceptability[ti] OR "Quality Improvement"[Mesh] OR QI[ti] OR "quality improvement"[tiab:~1] OR sustainment[tiab] OR sustainability[tiab] OR planning[ti] OR program*[ti]	860,945
#27	"Diffusion of Innovation"[Mesh] OR diffusion[title] OR dissemination[title]	84,742
#28	#26 OR #27	938,281
#29	#25 AND #28	4,951
#30	"Bright Futures"[tiab:~1]	96
#31	#29 OR #30	5,044
#32	#29 OR #30 Filters: from 2010 - 2023	3,493
#33	#29 OR #30 Filters: English, from 2010 - 2023	3,427
#34	(animals[mh:noexp] NOT humans[mh:noexp]) OR (bovine[tiab] OR canine[tiab] OR capra[tiab] OR cat[tiab] OR cats[tiab] OR cattle[tiab] OR cow[tiab] OR cows[tiab] OR dog[tiab] OR dogs[tiab] OR equine[tiab] OR ewe[tiab] OR ewes[tiab] OR feline[tiab] OR goat[tiab] OR goats[tiab] OR hamster*[tiab] OR horse[tiab] OR horses[tiab] OR invertebrate[tiab] OR invertebrates[tiab] OR macaque[tiab] OR macaques[tiab] OR mare[tiab] OR mares[tiab] OR mice[tiab] OR monkey[tiab] OR monkeys[tiab] OR mouse[tiab] OR murine[tiab] OR nonhuman[tiab] OR non-human[tiab] OR ovine[tiab] OR pig[tiab] OR pigs[tiab] OR porcine[tiab] OR primate[tiab] OR primates[tiab] OR rabbit[tiab] OR rabbits[tiab] OR rat[tiab] OR rats[tiab] OR rattus[tiab] OR rhesus[tiab] OR rodent*[tiab] OR sheep[tiab] OR simian[tiab] OR sow[tiab] OR sows[tiab] OR vertebrate[tiab] OR vertebrates[tiab] OR whale*[tiab] OR zebrafish[tiab])	6,545,037
#35	#33 NOT #34	3,413

Search	Query	Results
#36	afghanistan[Mesh:NoExp] OR africa[Mesh:NoExp] OR "africa, northern"[Mesh:NoExp] OR "africa, central"[Mesh:NoExp] OR "africa, eastern"[Mesh:NoExp] OR "africa south of the sahara"[Mesh:NoExp] OR "africa, southern"[Mesh:NoExp] OR "africa, western"[Mesh:NoExp] OR albania[Mesh:NoExp] OR algeria[Mesh:NoExp] OR andorra[Mesh:NoExp] OR angola[Mesh:NoExp] OR "antigua and barbuda"[Mesh:NoExp] OR argentina[Mesh:NoExp] OR armenia[Mesh:NoExp] OR azerbaijan[Mesh:NoExp] OR bahamas[Mesh:NoExp] OR bahrain[Mesh:NoExp] OR bangladesh[Mesh:NoExp] OR barbados[Mesh:NoExp] OR belize[Mesh:NoExp] OR benin[Mesh:NoExp] OR bhutan[Mesh:NoExp] OR bolivia[Mesh:NoExp] OR borneo[Mesh:NoExp] OR "bosnia and herzegovina"[Mesh:NoExp] OR botswana[Mesh:NoExp] OR brazil[Mesh:NoExp] OR brunei[Mesh:NoExp] OR bulgaria[Mesh:NoExp] OR "burkina faso"[Mesh:NoExp] OR burundi[Mesh:NoExp] OR "cabo verde"[Mesh:NoExp] OR cambodia[Mesh:NoExp] OR cameroon[Mesh:NoExp] OR "central african republic"[Mesh:NoExp] OR chad[Mesh:NoExp] OR china[Mesh] OR comoros[Mesh:NoExp] OR congo[Mesh:NoExp] OR croatia[Mesh:NoExp] OR cuba[Mesh:NoExp] OR "democratic republic of the congo"[Mesh:NoExp] OR cyprus[Mesh:NoExp] OR djibouti[Mesh:NoExp] OR dominica[Mesh:NoExp] OR "dominican republic"[Mesh:NoExp] OR ecuador[Mesh:NoExp] OR egypt[Mesh:NoExp] OR "el salvador"[Mesh:NoExp] OR "equatorial guinea"[Mesh:NoExp] OR eritrea[Mesh:NoExp] OR eswatini[Mesh:NoExp] OR ethiopia[Mesh:NoExp] OR fiji[Mesh:NoExp] OR gabon[Mesh:NoExp] OR gambia[Mesh:NoExp] OR "georgia (republic)"[Mesh:NoExp] OR ghana[Mesh:NoExp] OR grenada[Mesh:NoExp] OR guatemala[Mesh:NoExp] OR guinea[Mesh:NoExp] OR guinea-bissau[Mesh:NoExp] OR guyana[Mesh:NoExp] OR haiti[Mesh:NoExp] OR honduras[Mesh:NoExp] OR "independent state of samoa"[Mesh:NoExp] OR india[Mesh] OR "indian ocean islands"[Mesh:NoExp] OR indochina[Mesh:NoExp] OR indonesia[Mesh:NoExp] OR iran[Mesh:NoExp] OR iraq[Mesh:NoExp] OR jamaica[Mesh:NoExp] OR jordan[Mesh:NoExp] OR kazakhstan[Mesh:NoExp] OR kenya[Mesh:NoExp] OR kosovo[Mesh:NoExp] OR kuwait[Mesh:NoExp] OR kyrgyzstan[Mesh:NoExp] OR laos[Mesh:NoExp] OR lebanon[Mesh:NoExp] OR liechtenstein[Mesh:NoExp] OR lesotho[Mesh:NoExp] OR liberia[Mesh:NoExp] OR libya[Mesh:NoExp] OR madagascar[Mesh:NoExp] OR malaysia[Mesh:NoExp] OR malawi[Mesh:NoExp] OR mali[Mesh:NoExp] OR malta[Mesh:NoExp] OR mauritania[Mesh:NoExp] OR mauritius[Mesh:NoExp] OR "mekong valley"[Mesh:NoExp] OR melanesia[Mesh:NoExp] OR micronesia[Mesh:NoExp] OR monaco[Mesh:NoExp] OR mongolia[Mesh:NoExp] OR montenegro[Mesh:NoExp] OR morocco[Mesh:NoExp] OR mozambique[Mesh:NoExp] OR myanmar[Mesh:NoExp] OR namibia[Mesh:NoExp] OR nepal[Mesh:NoExp] OR nicaragua[Mesh:NoExp] OR niger[Mesh:NoExp] OR nigeria[Mesh:NoExp] OR oman[Mesh:NoExp] OR pakistan[Mesh:NoExp] OR palau[Mesh:NoExp] OR panama[Mesh] OR "papua new guinea"[Mesh:NoExp] OR paraguay[Mesh:NoExp] OR peru[Mesh:NoExp] OR philippines[Mesh:NoExp] OR qatar[Mesh:NoExp] OR "republic of belarus"[Mesh:NoExp] OR "republic of north macedonia"[Mesh:NoExp] OR romania[Mesh:NoExp] OR russia[Mesh] OR rwanda[Mesh:NoExp] OR "saint kitts and nevis"[Mesh:NoExp] OR "saint lucia"[Mesh:NoExp] OR "saint vincent and the grenadines"[Mesh:NoExp] OR "sao tome and principe"[Mesh:NoExp] OR "saudi arabia"[Mesh:NoExp] OR serbia[Mesh:NoExp] OR "sierra leone"[Mesh:NoExp] OR senegal[Mesh:NoExp] OR seychelles[Mesh:NoExp] OR singapore[Mesh:NoExp] OR somalia[Mesh:NoExp] OR "south sudan"[Mesh:NoExp] OR "sri lanka"[Mesh:NoExp] OR sudan[Mesh:NoExp] OR suriname[Mesh:NoExp] OR syria[Mesh:NoExp] OR taiwan[Mesh:NoExp] OR tajikistan[Mesh:NoExp] OR tanzania[Mesh:NoExp] OR thailand[Mesh:NoExp] OR timor-leste[Mesh:NoExp] OR togo[Mesh:NoExp] OR tonga[Mesh:NoExp] OR "trinidad and tobago"[Mesh:NoExp] OR tunisia[Mesh:NoExp] OR turkmenistan[Mesh:NoExp] OR uganda[Mesh:NoExp] OR ukraine[Mesh:NoExp] OR "united arab emirates"[Mesh:NoExp] OR uruguay[Mesh:NoExp] OR uzbekistan[Mesh:NoExp] OR vanuatu[Mesh:NoExp] OR venezuela[Mesh:NoExp] OR vietnam[Mesh:NoExp] OR "west indies"[Mesh:NoExp] OR yemen[Mesh:NoExp] OR zambia[Mesh:NoExp] OR zimbabwe[Mesh:NoExp]	1,256,271

Search	Query	Results
#37	"Organisation for Economic Co-Operation and Development"[Mesh:NoExp] OR "European Union"[Mesh:NoExp] OR "Developed Countries"[Mesh:NoExp] OR australasia[Mesh:NoExp] OR australia[Mesh] OR austria[Mesh:NoExp] OR "baltic states"[Mesh:NoExp] OR belgium[Mesh:NoExp] OR canada[Mesh] OR chile[Mesh:NoExp] OR colombia[Mesh:NoExp] OR "costa rica"[Mesh:NoExp] OR "czech republic"[Mesh:NoExp] OR denmark[Mesh] OR estonia[Mesh:NoExp] OR europe[Mesh:NoExp] OR finland[Mesh:NoExp] OR france[Mesh] OR germany[Mesh] OR greece[Mesh:NoExp] OR hungary[Mesh:NoExp] OR iceland[Mesh:NoExp] OR ireland[Mesh:NoExp] OR israel[Mesh:NoExp] OR italy[Mesh] OR japan[Mesh] OR korea[Mesh:NoExp] OR latvia[Mesh:NoExp] OR lithuania[Mesh:NoExp] OR luxembourg[Mesh:NoExp] OR mexico[Mesh:NoExp] OR netherlands[Mesh:NoExp] OR "new zealand"[Mesh:NoExp] OR "north america"[Mesh:NoExp] OR norway[Mesh] OR poland[Mesh:NoExp] OR portugal[Mesh:NoExp] OR "republic of korea"[Mesh] OR "scandinavian and nordic countries"[Mesh:NoExp] OR slovakia[Mesh:NoExp] OR slovenia[Mesh:NoExp] OR spain[Mesh:NoExp] OR sweden[Mesh:NoExp] OR switzerland[Mesh:NoExp] OR turkey[Mesh:NoExp] OR "united kingdom"[Mesh] OR "united states"[Mesh]	3,522,393
#38	#36 NOT #37	1,168,919
#39	#35 NOT #38	3,018
#40	Adverse Childhood Experiences[Mesh] OR Autism Spectrum Disorder[Mesh] OR Autistic Disorder[Mesh] OR autism[ti] OR autistic[ti] OR biomarker*[ti] OR breastfeed*[ti] OR "diagnostic accuracy"[ti] OR Psychometrics[Mesh] OR psychometric*[ti] OR Reproducibility of Results[Mesh] OR surgical[ti] OR surgery[ti] OR validation[ti] OR validity[ti] or yoga[ti]	1,501,614
#41	#39 NOT #40	2,560
#42	"Systematic Reviews as Topic"[Mesh] OR "cochrane database syst rev"[ta] OR "systematic literature review"[ti] OR "systematic review"[ti] OR ("systematic review"[tiab] AND review[pt]) OR "this systematic review"[tw] OR "meta-analysis"[pt] OR "meta-analysis as topic"[MeSH Terms] OR "meta-analyses"[tiab] OR "meta-analysis"[tiab] OR meta synthesis[tiab] OR "Umbrella Review"[tiab]	447,782
#43	#41 AND #42	156
#44	randomized controlled trial [pt] OR controlled clinical trial [pt] OR randomized [tiab] OR randomly [tiab] OR trial [tiab] OR groups [tiab] OR Phase III[tiab] OR Phase 3[tiab]	3,774,750
#45	#41 AND #44	1,040
#46	"Cohort Studies"[Mesh] OR cohort OR "Clinical Trial"[Publication Type] OR follow-up OR followup OR "different models" OR longitudinal OR "Research Design"[Mesh] OR "Evaluation Study"[Publication Type] OR "Comparative Study"[Publication Type] OR ((comparative OR Intervention) AND study) OR interrupted time* OR time serie* OR intervention* OR ((quasi-experiment* OR quasiexperiment* OR quasi OR experimental) AND (method OR study OR trial OR design*)) OR "real world" OR "real-world"	11,891,539
#47	#41 AND #46	2,217
#48	#47 NOT (review[pt] OR meta analysis[pt] OR case report[tw] OR consensus[mh] OR guideline[pt] OR history[sh])	2,003
#49	"Interrupted Time Series Analysis"[Mesh] OR "interrupted time series"[tiab:~1] OR "repeated measures"[tiab:~1] OR "repeated measures"[All Fields]	50,944
#50	#41 AND #49	32

Table A-2. APA PsycInfo, EBSCOhost, July 26, 2024

Search #	Query	Limiters/Expanders	Results
1	DE "Mental Disorders" OR DE "Affective Disorders" OR DE "Anxiety Disorders" OR DE "Behavior Disorders" OR DE "Bipolar Disorder" OR DE "Borderline States" OR DE "Chronic Mental Illness" OR DE "Dissociative Disorders" OR DE "Eating Disorders" OR DE "Gender Dysphoria" OR DE "Neurosis" OR DE "Obsessive Compulsive Disorder" OR DE "Paraphilias" OR DE "Personality Disorders" OR DE "Serious Mental Illness" OR DE "Sleep Wake Disorders" OR DE "Somatoform Disorders" OR DE "Substance Related and Addictive Disorders" OR DE "Thought Disorders"	Expanders - Apply equivalent subjects Search modes - Find all my search terms	320,224
2	"Adjustment Disorders" OR Anorexia OR Anorexic* OR "Antisocial Personality" OR "behavior disorder*" OR "behaviour disorder" OR "behavioral health" OR "behavioural health" OR Bipolar OR "Borderline Personality" OR "Capgras Syndrome" OR "Compulsive Personality" OR "Conversion Disorder" OR Cyclothymic OR cyclothymia OR Delir* OR "Dependent Personality" OR ((Disruptive OR "Impulse Control" OR impulsive*) AND ("Conduct Disorder" OR "Conduct Disorders" OR behavior OR behaviors OR behaviour OR behaviours)) OR dissociative OR dissociation OR Dyssomnia* OR "Emotional disorder" OR "Emotional disorders" OR "Emotion Disorder" OR "Emotion disorders" OR Exhibitionis* OR "Factitious Disorders" OR "Food Addiction" OR "Gender Dysphoria" OR "Histrionic Personality" OR Hypochondriasis OR hypochondriac* OR hypochondria OR Masochis* OR "Mood Disorders" OR "mood disorder" OR Mutism OR mute OR mutes OR "Obsessive-Compulsive Disorder" OR "Orthorexia Nervosa" OR "Panic Disorder" OR "Paranoid Personality" OR paranoi* OR "Paraphilic Disorders" OR Parasomnia* OR "Passive-Aggressive Personality" OR "Personality Disorder" OR "Phobic Disorders" OR phobia* OR "Reactive Attachment" OR (Relationship AND disturbances) OR Rumination OR Sadis* OR "Schizoid Personality" OR "Schizotypal Personality" OR "Sexual and Gender Disorders" OR "Sleep Wake Disorders" OR "social anxiety disorder" OR ("social behavior" AND disorder) OR ("social behaviour" AND disorder) OR "Somatoform Disorders" OR Voyeuris*	Expanders - Apply equivalent subjects Search modes - Find all my search terms	553,509
3	S1 OR S2	Expanders - Apply equivalent subjects Search modes - Find all my search terms	691,767
4	N/A	Limiters - Age Groups: Childhood (birth-12 yrs), Adolescence (13-17 yrs) Expanders - Apply equivalent subjects Search modes - Find all my search terms	891,386

Search #	Query	Limiters/Expanders	Results
5	(TI adolescen* OR AB adolescen*) OR (TI boys OR AB boys) OR (TI child OR AB child) OR (TI children* OR AB children*) OR (TI childhood OR AB childhood) OR (TI girls OR AB girls) OR (TI infant* OR AB infant*) OR (TI juvenile* OR AB juvenile*) OR (TI kindergarten* OR AB kindergarten*) OR (TI neonat* OR AB neonat*) OR (TI newborn* OR AB newborn*) OR (TI pediatric* OR AB pediatric*) OR (TI paediatric* OR AB paediatric*) OR TI “pre-school” OR AB “pre-school” OR TI “pre-schooler” OR AB “pre-schooler” OR TI “pre-schoolers” OR AB “pre-schoolers” OR (TI preschool* OR AB preschool*) OR (TI school-age* OR AB “school-age*”) OR (TI "school age*" OR AB "school age*") OR (TI teen OR AB teen) OR (TI teens OR AB teens) OR (TI teenage* OR AB teenage*) OR (TI youth* OR AB youth*)	Limiters - Age Groups: Childhood (birth-12 yrs), Adolescence (13-17 yrs) Expanders - Apply equivalent subjects Search modes - Find all my search terms	662,880
6	S3 AND (S4 OR S5)	Limiters - Age Groups: Childhood (birth-12 yrs), Adolescence (13-17 yrs) Expanders - Apply equivalent subjects Search modes - Find all my search terms	148,718
7	DE "Substance Related and Addictive Disorders" OR DE "Addiction" OR DE "Nonsubstance Related Addictions" OR DE "Substance Use Disorder" OR DE "Substance Use Disorder" OR DE "Alcohol Use Disorder" OR DE "Cannabis Use Disorder" OR DE "Drug Abuse" OR DE "Drug Dependency" OR DE "Inhalant Abuse" OR DE "Opioid Use Disorder" OR DE "Tobacco Use Disorder" OR TI "substance disorder" OR AB "substance disorder" OR TI "substance disorders" OR AB "substance disorders" OR TI "substance abuse" OR AB "substance abuse" OR TI "substance use" OR AB "substance use" OR TI "drug abuse" OR "drug abuse" OR TI "Amphetamine Disorders" OR AB "Amphetamine Disorders" OR TI "Amphetamine Disorder" OR AB "Amphetamine Disorder" OR TI "Cocaine Disorders" OR AB "Cocaine Disorders" OR TI "Cocaine Disorder" OR AB "Cocaine Disorder" OR (TI Inhalant* OR AB Inhalant*) OR (TI Marijuana OR AB Marijuana) OR TI "Narcotic-Related Disorders" OR AB "Narcotic-Related Disorders" OR TI "Narcotic-Related Disorder" OR AB "Narcotic-Related Disorder" OR TI "Neonatal Abstinence Syndrome" OR AB "Neonatal Abstinence Syndrome" OR TI "Phencyclidine Abuse" AB "Phencyclidine Abuse" OR TI "Substance Withdrawal Syndrome" OR AB "Substance Withdrawal Syndrome"	Expanders - Apply equivalent subjects Search modes - Find all my search terms	145,837
8	(TI tobacco OR AB tobacco) OR (TI cigarette* OR AB cigarette*) OR (TI smoking OR AB smoking) OR (TI smoker* OR AB smoker*) OR (TI vaping OR AB vaping) OR (TI vape* OR AB vape*)	Expanders - Apply equivalent subjects Search modes - Find all my search terms	73,704

Search #	Query	Limiters/Expanders	Results
9	DE "Alcohol Abuse" OR DE "Alcoholism" OR DE "Binge Drinking" OR DE "Alcohol Use" OR DE "Underage Drinking" OR DE "Alcohol Intoxication" OR DE "Acute Alcohol Intoxication" OR DE "Chronic Alcohol Intoxication" OR TI "alcohol abuse" OR AB "alcohol abuse" OR (TI "alcohol addiction*" OR AB "alcohol addiction*") OR TI "alcohol consumption" OR AB "alcohol consumption" OR (TI "alcohol depend*" OR AB "alcohol depend*") OR TI "alcohol misuse" OR AB "alcohol misuse" OR (TI "alcohol problem*" OR AB "alcohol problem*") OR TI "alcohol use" OR AB "alcohol use" OR TI alcoholic* OR AB alcoholic* OR (TI alcoholism OR AB alcoholism) OR (TI "alcohol use disorder*" OR AB "alcohol use disorder*") OR (((TI drinking OR AB drinking) OR (TI drinker OR AB drinker) OR (TI drinkers OR AB drinkers)) AND (TI alcohol* OR AB alcohol*)) OR (TI "harmful alcohol*" OR AB "harmful alcohol*") OR (TI "harmful drink*" OR AB "harmful drink*") OR (TI "problem drink*" OR AB "problem drink*")	Expanders - Apply equivalent subjects Search modes - Find all my search terms	119,050
10	S6 OR S7 OR S8	Expanders - Apply equivalent subjects Search modes - Find all my search terms	338,772
11	N/A	Limiters - Age Groups: School Age (6-12 yrs), Adolescence (13-17 yrs) Expanders - Apply equivalent subjects Search modes - Find all my search terms	680,272
12	S10 AND (TI adolescen* OR AB adolescen*) OR (TI boys OR AB boys) OR (TI child OR AB child) OR (TI children* OR AB children*) OR (TI childhood OR AB childhood) OR (TI girls OR AB girls) OR (TI juvenile* OR AB juvenile*) OR (TI pediatric* OR AB pediatric*) OR (TI paediatric* OR AB paediatric*) OR (TI teen OR AB teen) OR (TI teens OR AB teens) OR (TI teenage* OR AB teenage*) OR (TI youth* OR AB youth*)	Expanders - Apply equivalent subjects Search modes - Find all my search terms	964,896
13	(S10 AND S11) OR S12	Expanders - Apply equivalent subjects Search modes - Find all my search terms	999,462

Search #	Query	Limiters/Expanders	Results
14	DE "Anxiety Disorders" OR DE "Castration Anxiety" OR DE "Generalized Anxiety Disorder" OR DE "Panic Attack" OR DE "Panic Disorder" OR DE "Phobias" OR DE "Selective Mutism" OR DE "Separation Anxiety Disorder" OR DE "Anxiety" OR DE "Anxiety Sensitivity" OR DE "Climate Anxiety" OR DE "Computer Anxiety" OR DE "Death Anxiety" OR DE "Health Anxiety" OR DE "Mathematics Anxiety" OR DE "Performance Anxiety" OR DE "Social Anxiety" OR DE "Speech Anxiety" OR DE "Test Anxiety" OR DE "Travel Anxiety" OR agoraphobia OR (TI anxiety) OR TI "generalized anxiety disorder" OR AB "generalized anxiety disorder" OR (TI mutism OR AB mutism) OR TI "panic disorder" OR AB "panic disorder" OR (TI phobia* OR AB phobia*) OR TI "separation anxiety" OR AB "separation anxiety" OR TI "social anxiety" OR AB "social anxiety"	Expanders - Apply equivalent subjects Search modes - Find all my search terms	164,115
15	S14	Limiters - Age Groups: School Age (6-12 yrs), Adolescence (13-17 yrs) Expanders - Apply equivalent subjects Search modes - Find all my search terms	27,935
16	S14 AND (TI adolescen* OR AB adolescen*) OR (TI boys OR AB boys) OR (TI child OR AB child) OR (TI children* OR AB children*) OR (TI childhood OR AB childhood) OR (TI girls OR AB girls) OR (TI juvenile* OR AB juvenile*) OR (TI pediatric* OR AB pediatric*) OR (TI paediatric* OR AB paediatric*) OR (TI teen OR AB teen) OR (TI teens OR AB teens) OR (TI teenage* OR AB teenage*) OR (TI youth* OR AB youth*)	Expanders - Apply equivalent subjects Search modes - Find all my search terms	941,483
17	S15 OR S16	Expanders - Apply equivalent subjects Search modes - Find all my search terms	948,491
18	(DE "Major Depression" OR DE "Dysthymic Disorder" OR DE "Endogenous Depression" OR DE "Postpartum Depression" OR DE "Reactive Depression" OR DE "Recurrent Depression" OR DE "Treatment Resistant Depression") OR DE "Depression (Emotion)" OR (TI depress* OR AB depress*) OR (TI depression OR AB depression) OR (TI depressive OR AB depressive) OR (TI depressed OR AB depressed) OR (MH "Dysthymic Disorder+") OR (TI dysthymia OR AB dysthymia) OR (TI dysthymic OR AB dysthymic) OR TI "Persistent Depressive Disorder" OR AB "Persistent Depressive Disorder" OR DE "Suicidality" OR DE "Suicide" OR DE "Youth Suicide" OR DE "Attempted Suicide" OR (TI parasuicid* OR AB parasuicid*) OR TI "self harm" OR AB "self harm" OR (MH "Self-Injurious Behavior+") OR (TI suicid* OR AB suicid*)	Expanders - Apply equivalent subjects Search modes - Find all my search terms	416,093

Search #	Query	Limiters/Expanders	Results
19	S18	Limiters - Age Groups: School Age (6-12 yrs), Adolescence (13-17 yrs) Expanders - Apply equivalent subjects Search modes - Find all my search terms	63,204
20	S18 AND (TI adolescen* OR AB adolescen*) OR (TI boys OR AB boys) OR (TI child OR AB child) OR (TI children* OR AB children*) OR (TI childhood OR AB childhood) OR (TI girls OR AB girls) OR (TI juvenile* OR AB juvenile*) OR (TI pediatric* OR AB pediatric*) OR (TI paediatric* OR AB paediatric*) OR (TI teen OR AB teen) OR (TI teens OR AB teens) OR (TI teenage* OR AB teenage*) OR (TI youth* OR AB youth*)	Expanders - Apply equivalent subjects Search modes - Find all my search terms	951,845
21	S19 OR S20	Expanders - Apply equivalent subjects Search modes - Find all my search terms	966,459
22	S6 OR S13 OR S17 OR S21	Expanders - Apply equivalent subjects Search modes - Find all my search terms	1,020,920
23	TI "Ask Suicide-Screening Questions" OR AB "Ask Suicide-Screening Questions" OR (TI ASQ OR AB ASQ) OR TI "Columbia-Suicide Severity Rating Scale" OR AB "Columbia-Suicide Severity Rating Scale" OR (TI C-SSRS OR AB C-SSRS) OR TI "Patient Safety Screener" OR AB "Patient Safety Screener" OR (TI PSS-3 OR AB PSS-3) OR (TI PHQ-2 OR AB PHQ-2) OR TI "PHQ-9 Modified Teens" OR "PHQ-9 Modified	Expanders - Apply equivalent subjects Search modes - Find all my search terms	1,411
24	DE "Screening" OR DE "Screening Tests" OR DE "Screening Tests" OR DE "Psychological Screening Inventory" OR DE "Motivational Interviewing" OR DE "Risk Assessment" OR DE "Smoking Prevention" OR TI "risk assessment" OR AB "risk assessment" OR "risk assess*" OR (TI screen OR AB screen) OR (TI screening OR AB screening) OR (TI screened OR AB screened) OR (TI screens OR AB screens) OR (TI screenings OR AB screenings) OR TI "brief intervention" OR AB "brief intervention" OR TI "brief interventions" OR AB "brief interventions" OR TI "preventive care" OR AB "preventive care" OR TI "preventive intervention" OR AB "preventive intervention" OR TI "preventive interventions" OR AB "preventive interventions" OR TI "preventive behavioral health" OR AB "preventive behavioral health" OR TI "preventive mental health" OR AB "preventive mental health" OR TI "preventive psychosocial" OR AB "preventive psychosocial" OR (TI "recommended intervention*" OR AB "recommended intervention*")	Expanders - Apply equivalent subjects Search modes - Find all my search terms	164,513

Search #	Query	Limiters/Expanders	Results
25	DE "Counseling" OR DE "School Counseling" OR (TI counseling OR AB counseling) OR (TI counselling OR AB counselling) OR (TI counsel OR AB counsel) OR (TI counseled OR AB counseled) OR (TI counselled OR AB counselled) OR (TI counsels OR AB counsels)	Expanders - Apply equivalent subjects Search modes - Find all my search terms	101,176
26	S23 OR S24 OR S25	Expanders - Apply equivalent subjects Search modes - Find all my search terms	260,979
27	S22 AND S26	Expanders - Apply equivalent subjects Search modes - Find all my search terms	60,165
28	TI "implementation science" OR AB "implementation science" OR TI "implementation strategy" OR AB "implementation strategy" OR TI "implementation strategies" OR AB "implementation strategies" OR TI "implementation research" OR AB "implementation research" OR (TI "implementation model*" OR AB "implementation model*") OR (TI "implementation framework*" OR AB "implementation framework*") OR (TI Implement) OR (TI Implements) OR (TI Implemented) OR (TI Implementation) OR (TI Implement*) OR (TI acceptability OR AB acceptability) OR (TI acceptable OR AB acceptable) OR (TI Actionable OR AB Actionable) OR (TI Actionability OR AB Actionability) OR (MH Adoption+) OR (TI adoption OR AB adoption) OR (TI adopt*) OR (TI reach) OR (TI access) OR (TI acceptability) OR (MH "Quality Improvement+") OR (TI QI) OR TI "quality improvement" OR AB "quality improvement" OR (TI sustainment OR AB sustainment) OR (TI sustainability OR AB sustainability) OR (TI planning) OR (TI program*) OR (MH "Diffusion of Innovation+") OR (TI diffusion) OR (TI dissemination)	Expanders - Apply equivalent subjects Search modes - Find all my search terms	249,972
29	S27 AND S28	Expanders - Apply equivalent subjects Search modes - Find all my search terms	4,980
30	TI "Bright Futures" OR AB "Bright Futures"	Expanders - Apply equivalent subjects Search modes - Find all my search terms	34
31	S29 OR S30	Expanders - Apply equivalent subjects Search modes - Find all my search terms	5,013
32	S29 OR S30	Limiters - Publication Year: 2010-2023; English; Language: English Expanders - Apply equivalent subjects Search modes - Find all my search terms	3,090

Search #	Query	Limiters/Expanders	Results
33	S32	Limiters - Population Group: Human Expanders - Apply equivalent subjects Search modes - Find all my search terms	2,912
34	DE "Childhood Adversity" OR DE "Autism Spectrum Disorders" OR DE "Autistic Traits" OR DE "Psychometrics" OR DE "Classical Test Theory" OR DE "Consistency (Measurement)" OR DE "Error of Measurement" OR DE "External Validity" OR DE "Factor Analysis" OR DE "Internal Validity" OR DE "Item Analysis (Test)" OR DE "Item Response Theory" OR DE "Measurement Invariance" OR DE "Measurement Models" OR DE "Multivariate Analysis" OR DE "Test Construction" OR DE "Test Reliability" OR DE "Test Sensitivity" OR DE "Test Specificity" OR DE "Test Validity" OR DE "Variability Measurement" OR TI autism OR TI biomarker* OR TI breastfeed* OR TI “diagnostic accuracy” OR TI psychometric* OR TI reproducibility OR TI surgical OR TI surgery OR TI validation OR TI validity OR TI yoga	Expanders - Apply equivalent subjects Search modes - Find all my search terms	337,533
35	S33 NOT S34	Expanders - Apply equivalent subjects Search modes - Find all my search terms	2,344
36	S35	Limiters - Methodology: CLINICAL TRIAL, EMPIRICAL STUDY, INTERVIEW, -Focus Group, QUALITATIVE STUDY, QUANTITATIVE STUDY, TREATMENT OUTCOME Expanders - Apply equivalent subjects Search modes - Find all my search terms	1,812
37	S35	Limiters - Methodology: - Systematic Review, META ANALYSIS, METASYNTHESIS Expanders - Apply equivalent subjects Search modes - Find all my search terms	109

Table A-3. Cochrane Library, Wiley, July 26, 2024

Search #	Query	Results
#1	[mh "Mental Disorders"] OR [mh "Substance-Related Disorders"] OR [mh "Mental Health"] OR [mh "Mental Health Services"] OR [mh "Community Mental Health Services"] OR [mh "School Mental Health Services"] OR [mh "Social Behavior Disorders"] OR ("mental" NEXT disorder*):ti,ab OR "mental health services":ti,ab OR "substance abuse":ti,ab	116190
#2	"Adjustment Disorders":ti,ab,kw OR Anorexia:ti,ab,kw OR Anorexic*:ti,ab,kw OR "Antisocial Personality":ti,ab,kw OR ("behavior" NEXT disorder*):ti,ab,kw OR "behaviour disorder":ti,ab,kw OR "behavioral health":ti,ab,kw OR "behavioural health":ti,ab,kw OR Bipolar:ti,ab,kw OR "Borderline Personality":ti,ab,kw OR "Capgras Syndrome":ti,ab,kw OR "Compulsive Personality":ti,ab,kw OR "Conversion Disorder":ti,ab,kw OR Cyclothymic:ti,ab,kw OR cyclothymia:ti,ab,kw OR Delir*:ti,ab,kw OR "Dependent Personality":ti,ab,kw OR ((Disruptive:ti,ab,kw OR "Impulse Control":ti,ab,kw OR impulsive*:ti,ab,kw) AND ("Conduct Disorder":ti,ab,kw OR "Conduct Disorders" OR behavior:ti,ab,kw OR behaviors:ti,ab,kw OR behaviour:ti,ab,kw OR behaviours:ti,ab,kw)) OR dissociative:ti,ab,kw OR dissociation:ti,ab,kw OR Dyssomnia*:ti,ab,kw OR "Emotional disorder":ti,ab,kw OR "Emotional disorders":ti,ab,kw OR "Emotion Disorder":ti,ab,kw OR "Emotion disorders":ti,ab,kw OR Exhibitionis*:ti,ab,kw OR "Factitious Disorders":ti,ab,kw OR "Food Addiction":ti,ab,kw OR "Gender Dysphoria":ti,ab,kw OR "Histrionic Personality":ti,ab,kw OR Hypochondriasis:ti,ab,kw OR hypochondriac*:ti,ab,kw OR hypochondria:ti,ab,kw OR Masochis*:ti,ab,kw OR "Mood Disorders":ti,ab,kw OR "mood disorder":ti,ab,kw OR Mutism:ti,ab,kw OR mute:ti,ab,kw OR mutes:ti,ab,kw OR "Obsessive-Compulsive Disorder":ti,ab,kw OR "Orthorexia Nervosa":ti,ab,kw OR "Panic Disorder":ti,ab,kw OR "Paranoid Personality":ti,ab,kw OR paranoi*:ti,ab,kw OR "Paraphilic Disorders":ti,ab,kw OR Parasomnia*:ti,ab,kw OR "Passive-Aggressive Personality":ti,ab,kw OR "Personality Disorder":ti,ab,kw OR "Phobic Disorders":ti,ab,kw OR phobia*:ti,ab,kw OR "Reactive Attachment":ti,ab,kw OR (Relationship:ti,ab,kw AND disturbances:ti,ab,kw) OR Rumination:ti,ab,kw OR Sadis*:ti,ab,kw OR "Schizoid Personality":ti,ab,kw OR "Schizotypal Personality":ti,ab,kw OR "Sexual and Gender Disorders":ti,ab,kw OR "Sleep Wake Disorders":ti,ab,kw OR "social anxiety disorder":ti,ab,kw OR ("social behavior":ti,ab,kw AND disorder:ti,ab,kw) OR ("social behaviour":ti,ab,kw AND disorder:ti,ab,kw) OR "Somatoform Disorders":ti,ab,kw OR Voyeuris*:ti,ab,kw	50711
#3	#1 OR #2	143457
#4	[mh "Newborn"] OR [mh Infant] OR [mh "Preschool Child"] OR [mh Child] OR [mh Adolescent] OR adolescen*:ti,ab OR boys:ti,ab OR child:ti,ab OR children*:ti,ab OR childhood:ti,ab OR girls:ti,ab OR infant*:ti,ab OR juvenile*:ti,ab OR kindergarten*:ti,ab OR neonat*:ti,ab OR newborn*:ti,ab OR pediatric*:ti,ab OR paediatric*:ti,ab OR “pre-school”:ti,ab OR “pre-schooler”:ti,ab OR “pre-schoolers”:ti,ab OR preschool*:ti,ab OR (school NEXT age*):ti,ab OR teen:ti,ab OR teens:ti,ab OR teenage*:ti,ab OR youth*:ti,ab	331322
#5	#3 AND #4	35957
#6	[mh "Anxiety Disorders"] OR [mh Anxiety] OR agoraphobia OR anxiety:ti OR "generalized anxiety disorder":ti,ab OR mutism:ti,ab OR "panic disorder":ti,ab OR phobia*:ti,ab OR "separation anxiety":ti,ab OR "social anxiety":ti,ab	34493
#7	[mh Child] OR [mh Adolescent] OR adolescen*:ti,ab OR boys:ti,ab OR child:ti,ab OR children*:ti,ab OR childhood:ti,ab OR girls:ti,ab OR juvenile*:ti,ab OR pediatric*:ti,ab OR paediatric*:ti,ab OR teen:ti,ab OR teens:ti,ab OR teenage*:ti,ab OR youth*:ti,ab	284679
#8	#6 AND #7	8166
#9	[mh "Substance-Related Disorders"] OR "substance disorder":ti,ab OR "substance disorders":ti,ab OR "substance abuse":ti,ab OR "substance use":ti,ab OR "drug abuse":ti,ab OR "Amphetamine Disorders":ti,ab OR "Amphetamine Disorder":ti,ab OR "Cocaine Disorders":ti,ab OR "Cocaine Disorder":ti,ab OR Inhalant*:ti,ab OR Marijuana:ti,ab OR "Narcotic-Related Disorders":ti,ab OR "Narcotic-Related Disorder":ti,ab OR "Neonatal Abstinence Syndrome":ti,ab OR "Phencyclidine Abuse":ti,ab OR "Substance Withdrawal Syndrome":ti,ab	26959
#10	[mh "Tobacco Use"] OR [mh "Tobacco, Smokeless"] OR [mh "Tobacco Use Disorder"] OR [mh "Tobacco Smoking"] OR [mh "Tobacco Use Cessation"] OR [mh "Tobacco Use Cessation Devices"] OR "Tobacco Use":ti,ab OR tobacco:ti,ab OR cigarette*:ti,ab OR smoking:ti,ab OR smoker*:ti,ab OR vaping:ti,ab OR vape*:ti,ab	42822

Search #	Query	Results
#11	[mh "Alcohol-Related Disorders"] OR [mh Alcoholics] OR [mh Alcoholism] OR [mh "Alcohol Drinking"] OR "alcohol abuse":ti,ab OR (alcohol NEXT addiction*):ti,ab OR "alcohol consumption":ti,ab OR (alcohol NEXT depend*):ti,ab OR "alcohol misuse":ti,ab OR (alcohol NEXT problem*):ti,ab OR "alcohol use":ti,ab OR alcoholism:ti,ab OR ("alcohol use" NEXT disorder*):ti,ab OR ((drinking:ti,ab OR drinker:ti,ab OR drinkers:ti,ab) AND alcohol*:ti,ab) OR (harmful NEXT alcohol*):ti,ab OR (harmful NEXT drink*):ti,ab OR (problem NEXT drink*):ti,ab	19831
#12	#9 OR #10 OR #11	73334
#13	#12 AND #7	12205
#14	[mh "Depressive Disorder"] OR [mh "Depressive Disorder, Major"] OR [mh Depression] OR depress*:ti,ab OR depression:ti,ab OR depressive:ti,ab OR depressed:ti,ab OR [mh "Dysthymic Disorder"] OR dysthymia:ti,ab OR dysthymic:ti,ab OR "Persistent Depressive Disorder":ti,ab OR [mh Suicide] OR [mh "Suicide, Attempted"] OR [mh "Suicide, Completed"] OR [mh "Suicidal Ideation"] OR parasuicid*:ti,ab OR "self harm":ti,ab OR [mh "Self-Injurious Behavior"] OR suicid*:ti,ab	106333
#15	[mh Child] OR [mh Adolescent] OR adolescen*:ti,ab OR boys:ti,ab OR child:ti,ab OR children*:ti,ab OR childhood:ti,ab OR girls:ti,ab OR pediatric*:ti,ab OR paediatric*:ti,ab OR teen:ti,ab OR teens:ti,ab OR teenage*:ti,ab OR youth*:ti,ab	283958
#16	#14 AND #15	16604
#17	#5 OR #8 OR #13 OR #16	52960
#18	"Ask Suicide-Screening Questions":ti,ab OR ASQ:ti,ab OR "Columbia-Suicide Severity Rating Scale":ti,ab OR C-SSRS:ti,ab OR "Patient Safety Screener":ti,ab OR PSS-3:ti,ab OR PHQ-2:ti,ab OR "PHQ-9 Modified Teens":ti,ab OR PHQ-A:ti,ab OR PHQ-9:ti,ab OR "Alcohol Screening Brief Intervention Youth":ti,ab OR "Brief Screener Alcohol Tobacco other Drugs":ti,ab OR BSTAD:ti,ab OR "Car Relax Alone Forget Friends Trouble":ti,ab OR CRAFFT:ti,ab OR "Screening Brief Intervention":ti,ab OR S2BI:ti,ab OR "Pediatric Symptom Checklist":ti,ab	4392
#19	[mh "Mass Screening"] OR [mh "Motivational Interviewing"] OR [mh "Risk Assessment"] OR "risk assessment":ti,ab OR (risk NEXT assess*) OR screen:ti,ab OR screening:ti,ab OR screened:ti,ab OR screens:ti,ab OR screenings:ti,ab OR "brief intervention":ti,ab OR "brief interventions":ti,ab OR "preventive care":ti,ab OR "preventive intervention"":ti,ab OR "preventive interventions":ti,ab OR "preventive behavioral health":ti,ab OR "preventive mental health"":ti,ab OR "preventive psychosocial":ti,ab OR ("recommended" NEXT intervention*):ti,ab	133874
#20	[mh "Counseling"] OR counseling:ti,ab OR counselling:ti,ab OR counsel:ti,ab OR counseled:ti,ab OR counselled:ti,ab OR counsels:ti,ab OR "motivational interviewing":ti,ab	29372
#21	#18 OR #19 OR #20	159512
#22	#17 AND #21	9570
#23	[mh "Community Health Planning"] OR [mh "Health Plan Implementation"] OR [mh "Implementation Science"] OR "implementation science":ti,ab OR "implementation strategy":ti,ab OR "implementation strategies":ti,ab OR "implementation research":ti,ab OR (implementation NEXT model*):ti,ab OR ("implementation" NEXT framework*):ti,ab OR Implement:ti OR Implements:ti OR Implemented:ti OR Implementation:ti OR Implement*:ti OR acceptability:ti,ab OR acceptable:ti,ab OR Actionable:ti,ab OR Actionability:ti,ab OR [mh Adoption] OR adoption:ti,ab OR adopt*:ti OR reach:ti OR access:ti OR acceptability:ti OR [mh "Quality Improvement"] OR QI:ti OR "quality improvement":ti,ab OR sustainment:ti,ab OR sustainability:ti,ab OR planning:ti OR program*:ti OR [mh "Diffusion of Innovation"] OR diffusion:ti OR dissemination:ti	109754
#24	#22 AND #23	1767
#25	"Bright Futures":ti,ab	19
#26	#24 OR #25	1786

Search #	Query	Results
#27	([mh ^animals] NOT [mh ^humans]) OR (bovine:ti,ab OR canine:ti,ab OR capra:ti,ab OR cat:ti,ab OR cats:ti,ab OR cattle:ti,ab OR cow:ti,ab OR cows:ti,ab OR dog:ti,ab OR dogs:ti,ab OR equine:ti,ab OR ewe:ti,ab OR ewes:ti,ab OR feline:ti,ab OR goat:ti,ab OR goats:ti,ab OR hamster*:ti,ab OR horse:ti,ab OR horses:ti,ab OR invertebrate:ti,ab OR invertebrates:ti,ab OR macaque:ti,ab OR macaques:ti,ab OR mare:ti,ab OR mares:ti,ab OR mice:ti,ab OR monkey:ti,ab OR monkeys:ti,ab OR mouse:ti,ab OR murine:ti,ab OR nonhuman:ti,ab OR non-human:ti,ab OR ovine:ti,ab OR pig:ti,ab OR pigs:ti,ab OR porcine:ti,ab OR primate:ti,ab OR primates:ti,ab OR rabbit:ti,ab OR rabbits:ti,ab OR rat:ti,ab OR rats:ti,ab OR rattus:ti,ab OR rhesus:ti,ab OR rodent*:ti,ab OR sheep:ti,ab OR simian:ti,ab OR sow:ti,ab OR sows:ti,ab OR vertebrate:ti,ab OR vertebrates:ti,ab OR whale*:ti,ab OR zebrafish:ti,ab)	31150
#28	#26 NOT #27	1757
#29	[mh "Adverse Childhood Experiences"] OR [mh "Autism Spectrum Disorder"] OR [mh "Autistic Disorder"] OR autism:ti OR autistic:ti OR biomarker*:ti OR breastfeed*:ti OR "diagnostic accuracy":ti OR [mh Psychometrics] OR psychometric*:ti OR [mh "Reproducibility of Results"] OR surgical:ti OR surgery:ti OR validation:ti OR validity:ti OR yoga:ti	125,756
#30	#28 NOT #29	1,658
#31	#30 Limited to Systematic reviews published 2010-2023	46
#32	#30 Limited to Protocols published 2010-2023	1
#33	#30 Limited to Trials published 2010-2023	1,354

Table A-4. CINAHL, EBSCOhost, July 26, 2024

Search #	Query	Limiters/Expanders	Results
S1	(MH "Mental Disorders+") OR (MH "Substance-Related Disorders+") OR (MM "Mental Health+") OR (MM "Mental Health Services+") OR (MH "Community Mental Health Services+") OR (MH "School Mental Health Services+") OR (MH "Social Behavior Disorders+") OR TI "mental disorder*" OR AB "mental disorder*" OR TI "mental health services" OR AB "mental health services" OR TI "substance abuse" OR TI "substance abuse"	Expanders - Apply equivalent subjects Search modes - Find all my search terms	804,964
2	"Adjustment Disorders" OR Anorexia OR Anorexic* OR "Antisocial Personality" OR "behavior disorder*" OR "behaviour disorder" OR "behavioral health" OR "behavioural health" OR Bipolar OR "Borderline Personality" OR "Capgras Syndrome" OR "Compulsive Personality" OR "Conversion Disorder" OR Cyclothymic OR cyclothymia OR Delir* OR "Dependent Personality" OR ((Disruptive OR "Impulse Control" OR impulsive*) AND ("Conduct Disorder" OR "Conduct Disorders" OR behavior OR behaviors OR behaviour OR behaviours)) OR dissociative OR dissociation OR Dyssomnia* OR "Emotional disorder" OR "Emotional disorders" OR "Emotion Disorder" OR "Emotion disorders" OR Exhibitionis* OR "Factitious Disorders" OR "Food Addiction" OR "Gender Dysphoria" OR "Histrionic Personality" OR Hypochondriasis OR hypochondriac* OR hypochondria OR Masochis* OR "Mood Disorders" OR "mood disorder" OR Mutism OR mute OR mutes OR "Obsessive-Compulsive Disorder" OR "Orthorexia Nervosa" OR "Panic Disorder" OR "Paranoid Personality" OR paranoi* OR "Paraphilic Disorders" OR Parasomnia* OR "Passive-Aggressive Personality" OR "Personality Disorder" OR "Phobic Disorders" OR phobia* OR "Reactive Attachment" OR (Relationship AND disturbances) OR Rumination OR Sadis* OR "Schizoid Personality" OR "Schizotypal Personality" OR "Sexual and Gender Disorders" OR "Sleep Wake Disorders" OR "social anxiety disorder" OR ("social behavior" AND disorder) OR ("social behaviour" AND disorder) OR "Somatoform Disorders" OR Voyeuris*	Expanders - Apply equivalent subjects Search modes - Find all my search terms	179,140
3	S1 OR S2	Expanders - Apply equivalent subjects Search modes - Find all my search terms	854,422
4	(MH "Newborn+") OR (MH Infant+) OR (MH "Preschool Child+") OR (MH Child+) OR (MH Adolescent+) OR (TI adolescen* OR AB adolescen*) OR (TI boys OR AB boys) OR (TI child OR AB child) OR (TI children* OR AB children*) OR (TI childhood OR AB childhood) OR (TI girls OR AB girls) OR (TI infant* OR AB infant*) OR (TI juvenile* OR AB juvenile*) OR (TI kindergarten* OR AB kindergarten*) OR (TI neonat* OR AB neonat*) OR (TI newborn* OR AB newborn*) OR (TI pediatric* OR AB pediatric*) OR (TI paediatric* OR AB paediatric*) OR TI “pre-school” OR AB “pre-school” OR TI “pre-schooler” OR AB “pre-schooler” OR TI “pre-schoolers” OR AB “pre-schoolers” OR (TI preschool* OR AB preschool*) OR (TI school-age* OR AB “school-age*”) OR (TI "school age*" OR AB "school age*") OR (TI teen OR AB teen) OR (TI teens OR AB teens) OR (TI teenage* OR AB teenage*) OR (TI youth* OR AB youth*)	Expanders - Apply equivalent subjects Search modes - Find all my search terms	1,186,369

Search #	Query	Limiters/Expanders	Results
5	S3 AND S4	Expanders - Apply equivalent subjects Search modes - Find all my search terms	215,022
6	(MH "Anxiety Disorders+") OR (MH Anxiety+) OR agoraphobia OR (TI anxiety) OR TI "generalized anxiety disorder" OR AB "generalized anxiety disorder" OR (TI mutism OR AB mutism) OR TI "panic disorder" OR AB "panic disorder" OR (TI phobia* OR AB phobia*) OR TI "separation anxiety" OR AB "separation anxiety" OR TI "social anxiety" OR AB "social anxiety"	Expanders - Apply equivalent subjects Search modes - Find all my search terms	116,573
7	(MH "Child+") OR (MH Adolescent+) OR (TI adolescen* OR AB adolescen*) OR (TI boys OR AB boys) OR (TI child OR AB child) OR (TI children* OR AB children*) OR (TI childhood OR AB childhood) OR (TI girls OR AB girls) OR (TI juvenile* OR AB juvenile*) OR (TI pediatric* OR AB pediatric*) OR (TI paediatric* OR AB paediatric*) OR (TI teen OR AB teen) OR (TI teens OR AB teens) OR (TI teenage* OR AB teenage*) OR (TI youth* OR AB youth*)	Expanders - Apply equivalent subjects Search modes - Find all my search terms	1,132,973
8	S6 AND S7	Expanders - Apply equivalent subjects Search modes - Find all my search terms	27,371
9	(MH "Substance-Related Disorders+") OR TI "substance disorder" OR AB "substance disorder" OR TI "substance disorders" OR AB "substance disorders" OR TI "substance abuse" OR AB "substance abuse" OR TI "substance use" OR AB "substance use" OR TI "drug abuse" OR "drug abuse" OR TI "Amphetamine Disorders" OR AB "Amphetamine Disorders" OR TI "Amphetamine Disorder" OR AB "Amphetamine Disorder" OR TI "Cocaine Disorders" OR AB "Cocaine Disorders" OR TI "Cocaine Disorder" OR AB "Cocaine Disorder" OR (TI Inhalant* OR AB Inhalant*) OR (TI Marijuana OR AB Marijuana) OR TI "Narcotic-Related Disorders" OR AB "Narcotic-Related Disorders" OR TI "Narcotic-Related Disorder" OR AB "Narcotic-Related Disorder" OR TI "Neonatal Abstinence Syndrome" OR AB "Neonatal Abstinence Syndrome" OR TI "Phencyclidine Abuse" AB "Phencyclidine Abuse" OR TI "Substance Withdrawal Syndrome" OR AB "Substance Withdrawal Syndrome"	Expanders - Apply equivalent subjects Search modes - Find all my search terms	70,731
10	(MH "Tobacco Use+") OR (MH "Tobacco, Smokeless+") OR (MH "Tobacco Use Disorder+") OR (MH "Tobacco Smoking+") OR (MH "Tobacco Use Cessation+") OR (MH "Tobacco Use Cessation Devices+") OR (TI tobacco OR AB tobacco) OR (TI cigarette* OR AB cigarette*) OR (TI smoking OR AB smoking) OR (TI smoker* OR AB smoker*) OR (TI vaping OR AB vaping) OR (TI vape* OR AB vape*)	Expanders - Apply equivalent subjects Search modes - Find all my search terms	125,565

Search #	Query	Limiters/Expanders	Results
11	(MH "Alcohol-Related Disorders+") OR (MH Alcoholics+) OR (MH Alcoholism+) OR (MH "Alcohol Drinking+") OR TI "alcohol abuse" OR AB "alcohol abuse" OR (TI "alcohol addiction*" OR AB "alcohol addiction*") OR TI "alcohol consumption" OR AB "alcohol consumption" OR (TI "alcohol depend*" OR AB "alcohol depend*") OR TI "alcohol misuse" OR AB "alcohol misuse" OR (TI "alcohol problem*" OR AB "alcohol problem*") OR TI "alcohol use" OR AB "alcohol use" OR (TI alcoholism OR AB alcoholism) OR (TI "alcohol use disorder*" OR AB "alcohol use disorder*") OR (((TI drinking OR AB drinking) OR (TI drinker OR AB drinker) OR (TI drinkers OR AB drinkers)) AND (TI alcohol* OR AB alcohol*)) OR (TI "harmful alcohol*" OR AB "harmful alcohol*") OR (TI "harmful drink*" OR AB "harmful drink*") OR (TI "problem drink*" OR AB "problem drink*")	Expanders - Apply equivalent subjects Search modes - Find all my search terms	93,787
12	S9 OR S10 OR S11	Expanders - Apply equivalent subjects Search modes - Find all my search terms	255,956
13	S12 AND S7	Expanders - Apply equivalent subjects Search modes - Find all my search terms	50,079
14	(MH "Depressive Disorder+") OR (MH "Depressive Disorder, Major+") OR (MH Depression+) OR (TI depress* OR AB depress*) OR (TI depression OR AB depression) OR (TI depressive OR AB depressive) OR (TI depressed OR AB depressed) OR (MH "Dysthymic Disorder+") OR (TI dysthymia OR AB dysthymia) OR (TI dysthymic OR AB dysthymic) OR TI "Persistent Depressive Disorder" OR AB "Persistent Depressive Disorder" OR (MH Suicide+) OR (MH "Suicide, Attempted+") OR (MH "Suicide, Completed+") OR (MH "Suicidal Ideation+") OR (TI parasuicid* OR AB parasuicid*) OR TI "self harm" OR AB "self harm" OR (MH "Self-Injurious Behavior+") OR (TI suicid* OR AB suicid*)	Expanders - Apply equivalent subjects Search modes - Find all my search terms	259,910
15	(MH "Child+") OR (MH Adolescent+) OR (TI adolescen* OR AB adolescen*) OR (TI boys OR AB boys) OR (TI child OR AB child) OR (TI children* OR AB children*) OR (TI childhood OR AB childhood) OR (TI girls OR AB girls) OR (TI pediatric* OR AB pediatric*) OR (TI paediatric* OR AB paediatric*) OR (TI teen OR AB teen) OR (TI teens OR AB teens) OR (TI teenage* OR AB teenage*) OR (TI youth* OR AB youth*)	Expanders - Apply equivalent subjects Search modes - Find all my search terms	1,128,877
16	S14 AND S15	Expanders - Apply equivalent subjects Search modes - Find all my search terms	50,967

Search #	Query	Limiters/Expanders	Results
17	TI "Ask Suicide-Screening Questions" OR AB "Ask Suicide-Screening Questions" OR (TI ASQ OR AB ASQ) OR TI "Columbia-Suicide Severity Rating Scale" OR AB "Columbia-Suicide Severity Rating Scale" OR (TI C-SSRS OR AB C-SSRS) OR TI "Patient Safety Screener" OR AB "Patient Safety Screener" OR (TI PSS-3 OR AB PSS-3) OR (TI PHQ-2 OR AB PHQ-2) OR TI "PHQ-9 Modified Teens" OR "PHQ-9 Modified Teens" OR (TI PHQ-A OR AB PHQ-A) OR (TI PHQ-9 OR AB PHQ-9) OR TI "Alcohol Screening Brief Intervention Youth" OR AB "Alcohol Screening Brief Intervention Youth" OR TI "Brief Screener Alcohol Tobacco other Drugs" OR AB "Brief Screener Alcohol Tobacco other Drugs" OR (TI BSTAD OR AB BSTAD) OR TI "Car Relax Alone Forget Friends Trouble" OR AB "Car Relax Alone Forget Friends Trouble" OR (TI CRAFFT OR AB CRAFFT) OR TI "Screening Brief Intervention" OR AB "Screening Brief Intervention" OR (TI S2BI OR AB S2BI) OR TI "Pediatric Symptom Checklist" OR AB "Pediatric Symptom Checklist"	Expanders - Apply equivalent subjects Search modes - Find all my search terms	4,338
18	(MH "Mass Screening+") OR (MH "Motivational Interviewing+") OR (MH "Risk Assessment+") OR TI "risk assessment" OR AB "risk assessment" OR "risk assess*" OR (TI screen OR AB screen) OR (TI screening OR AB screening) OR (TI screened OR AB screened) OR (TI screens OR AB screens) OR (TI screenings OR AB screenings) OR TI "brief intervention" OR AB "brief intervention" OR TI "brief interventions" OR AB "brief interventions" OR TI "preventive care" OR AB "preventive care" OR TI "preventive intervention" OR AB "preventive intervention" OR TI "preventive interventions" OR AB "preventive interventions" OR TI "preventive behavioral health" OR AB "preventive behavioral health" OR TI "preventive mental health" OR AB "preventive mental health" OR TI "preventive psychosocial" OR AB "preventive psychosocial" OR (TI "recommended intervention*" OR AB "recommended intervention*")	Expanders - Apply equivalent subjects Search modes - Find all my search terms	387,278
19	(MH "Counseling+") OR (TI counseling OR AB counseling) OR (TI counselling OR AB counselling) OR (TI counsel OR AB counsel) OR (TI counseled OR AB counseled) OR (TI counselled OR AB counselled) OR (TI counsels OR AB counsels) OR TI "motivational interviewing" OR AB "motivational interviewing"	Expanders - Apply equivalent subjects Search modes - Find all my search terms	89,991
20	S5 OR S8 OR S13 OR S16	Expanders - Apply equivalent subjects Search modes - Find all my search terms	248,888
21	S17 OR S18 OR S19	Expanders - Apply equivalent subjects Search modes - Find all my search terms	465,403
22	S20 AND S21	Expanders - Apply equivalent subjects Search modes - Find all my search terms	30,235

Search #	Query	Limiters/Expanders	Results
23	(MH "Community Health Planning+") OR (MH "Health Plan Implementation+") OR (MH "Implementation Science+") OR TI "implementation science" OR AB "implementation science" OR TI "implementation strategy" OR AB "implementation strategy" OR TI "implementation strategies" OR AB "implementation strategies" OR TI "implementation research" OR AB "implementation research" OR (TI "implementation model*" OR AB "implementation model*") OR (TI "implementation framework*" OR AB "implementation framework*") OR (TI Implement) OR (TI Implements) OR (TI Implemented) OR (TI Implementation) OR (TI Implement*) OR (TI acceptability OR AB acceptability) OR (TI acceptable OR AB acceptable) OR (TI Actionable OR AB Actionable) OR (TI Actionability OR AB Actionability) OR (MH Adoption+) OR (TI adoption OR AB adoption) OR (TI adopt*) OR (TI reach) OR (TI access) OR (TI acceptability) OR (MH "Quality Improvement+") OR (TI QI) OR TI "quality improvement" OR AB "quality improvement" OR (TI sustainment OR AB sustainment) OR (TI sustainability OR AB sustainability) OR (TI planning) OR (TI program*) OR (MH "Diffusion of Innovation+") OR (TI diffusion) OR (TI dissemination)	Expanders - Apply equivalent subjects Search modes - Find all my search terms	447,514
24	S22 AND S23	Expanders - Apply equivalent subjects Search modes - Find all my search terms	2,472
25	TI "Bright Futures" OR AB "Bright Futures"	Expanders - Apply equivalent subjects Search modes - Find all my search terms	80
26	S24 OR S25	Expanders - Apply equivalent subjects Search modes - Find all my search terms	2,551
27	S26	Limiters - Published Date: 20100101-20231031; English Language; Language: English Expanders - Apply equivalent subjects Search modes - Find all my search terms	2,055

Search #	Query	Limiters/Expanders	Results
28	((MH animals) NOT (MH humans)) OR ((TI bovine OR AB bovine) OR (TI canine OR AB canine) OR (TI capra OR AB capra) OR (TI cat OR AB cat) OR (TI cats OR AB cats) OR (TI cattle OR AB cattle) OR (TI cow OR AB cow) OR (TI cows OR AB cows) OR (TI dog OR AB dog) OR (TI dogs OR AB dogs) OR (TI equine OR AB equine) OR (TI ewe OR AB ewe) OR (TI ewes OR AB ewes) OR (TI feline OR AB feline) OR (TI goat OR AB goat) OR (TI goats OR AB goats) OR (TI hamster* OR AB hamster*) OR (TI horse OR AB horse) OR (TI horses OR AB horses) OR (TI invertebrate OR AB invertebrate) OR (TI invertebrates OR AB invertebrates) OR (TI macaque OR AB macaque) OR (TI macaques OR AB macaques) OR (TI mare OR AB mare) OR (TI mares OR AB mares) OR (TI mice OR AB mice) OR (TI monkey OR AB monkey) OR (TI monkeys OR AB monkeys) OR (TI mouse OR AB mouse) OR (TI murine OR AB murine) OR (TI nonhuman OR AB nonhuman) OR (TI non-human OR AB non-human) OR (TI ovine OR AB ovine) OR (TI pig OR AB pig) OR (TI pigs OR AB pigs) OR (TI porcine OR AB porcine) OR (TI primate OR AB primate) OR (TI primates OR AB primates) OR (TI rabbit OR AB rabbit) OR (TI rabbits OR AB rabbits) OR (TI rat OR AB rat) OR (TI rats OR AB rats) OR (TI rattus OR AB rattus) OR (TI rhesus OR AB rhesus) OR (TI rodent* OR AB rodent*) OR (TI sheep OR AB sheep) OR (TI simian OR AB simian) OR (TI sow OR AB sow) OR (TI sows OR AB sows) OR (TI vertebrate OR AB vertebrate) OR (TI vertebrates OR AB vertebrates) OR (TI whale* OR AB whale*) OR (TI zebrafish OR AB zebrafish))	Expanders - Apply equivalent subjects Search modes - Find all my search terms	287,970
29	S27 NOT S28	Expanders - Apply equivalent subjects Search modes - Find all my search terms	2,050

Search #	Query	Limiters/Expanders	Results
30	(MH "afghanistan") OR (MH africa) OR (MH "africa, northern") OR (MH "africa, central") OR (MH "africa, eastern") OR (MH "africa south of the sahara") OR (MH "africa, southern") OR (MH "africa, western") OR (MH albania) OR (MH algeria) OR (MH andorra) OR (MH angola) OR (MH "antigua and barbuda") OR (MH argentina) OR (MH armenia) OR (MH azerbaijan) OR (MH bahamas) OR (MH bahrain) OR (MH bangladesh) OR (MH barbados) OR (MH belize) OR (MH benin) OR (MH bhutan) OR (MH bolivia) OR (MH borneo) OR (MH "bosnia and herzegovina") OR (MH botswana) OR (MH brazil) OR (MH brunei) OR (MH bulgaria) OR (MH "burkina faso") OR (MH burundi) OR (MH "cabo verde") OR (MH cambodia) OR (MH cameroon) OR (MH "central african republic") OR (MH chad) OR (MH china+) OR (MH comoros) OR (MH congo) OR (MH croatia) OR (MH cuba) OR (MH "democratic republic of the congo") OR (MH cyprus) OR (MH djibouti) OR (MH dominica) OR (MH "dominican republic") OR (MH ecuador) OR (MH egypt) OR (MH "el salvador") OR (MH "equatorial guinea") OR (MH eritrea) OR (MH eswatini) OR (MH ethiopia) OR (MH fiji) OR (MH gabon) OR (MH gambia) OR (MH "georgia (republic)") OR (MH ghana) OR (MH grenada) OR (MH guatemala) OR (MH guinea) OR (MH guinea-bissau) OR (MH guyana) OR (MH haiti) OR (MH honduras) OR (MH "independent state of samoa") OR (MH india+) OR (MH "indian ocean islands") OR (MH indochina) OR (MH indonesia) OR (MH iran) OR (MH iraq) OR (MH jamaica) OR (MH jordan) OR (MH kazakhstan) OR (MH kenya) OR (MH kosovo) OR (MH kuwait) OR (MH kyrgyzstan) OR (MH laos) OR (MH lebanon) OR (MH liechtenstein) OR (MH lesotho) OR (MH liberia) OR (MH libya) OR (MH madagascar) OR (MH malaysia) OR (MH malawi) OR (MH mali) OR (MH malta) OR (MH mauritania) OR (MH mauritius) OR (MH "mekong valley") OR (MH melanesia) OR (MH micronesia) OR (MH monaco) OR (MH mongolia) OR (MH montenegro) OR (MH morocco) OR (MH mozambique) OR (MH myanmar) OR (MH namibia) OR (MH nepal) OR (MH nicaragua) OR (MH niger) OR (MH nigeria) OR (MH oman) OR (MH pakistan) OR (MH palau) OR (MH panama+) OR (MH "papua new guinea") OR (MH paraguay) OR (MH peru) OR (MH philippines) OR (MH qatar) OR (MH "republic of belarus") OR (MH "republic of north macedonia") OR (MH romania) OR (MH russia+) OR (MH rwanda) OR (MH "saint kitts and nevis") OR (MH "saint lucia") OR (MH "saint vincent and the grenadines") OR (MH "sao tome and principe") OR (MH "saudi arabia") OR (MH serbia) OR (MH "sierra leone") OR (MH senegal) OR (MH seychelles) OR (MH singapore) OR (MH somalia) OR (MH "south sudan") OR (MH "sri lanka") OR (MH sudan) OR (MH suriname) OR (MH syria) OR (MH taiwan) OR (MH tajikistan) OR (MH tanzania) OR (MH thailand) OR (MH timor-leste) OR (MH togo) OR (MH tonga) OR (MH "trinidad and tobago") OR (MH tunisia) OR (MH turkmenistan) OR (MH uganda) OR (MH ukraine) OR (MH "united arab emirates") OR (MH uruguay) OR (MH uzbekistan) OR (MH vanuatu) OR (MH venezuela) OR (MH vietnam) OR (MH "west indies") OR (MH yemen) OR (MH zambia) OR (MH zimbabwe)	Expanders - Apply equivalent subjects Search modes - Find all my search terms	404,574

Search #	Query	Limiters/Expanders	Results
31	(MH "European Union") OR (MH "Developed Countries") OR (MH australasia) OR (MH australia+) OR (MH austria) OR (MH "baltic states") OR (MH belgium) OR (MH canada+) OR (MH chile) OR (MH colombia) OR (MH "costa rica") OR (MH "czech republic") OR (MH denmark+) OR (MH estonia) OR (MH europe) OR (MH finland) OR (MH france+) OR (MH germany+) OR (MH greece) OR (MH hungary) OR (MH iceland) OR (MH ireland) OR (MH israel) OR (MH italy+) OR (MH japan+) OR (MH korea) OR (MH latvia) OR (MH lithuania) OR (MH luxembourg) OR (MH mexico) OR (MH netherlands) OR (MH "new zealand") OR (MH "north america") OR (MH norway+) OR (MH poland) OR (MH portugal) OR (MH "republic of korea+") OR (MH "scandinavian and nordic countries") OR (MH slovakia) OR (MH slovenia) OR (MH spain) OR (MH sweden) OR (MH switzerland) OR (MH turkey) OR (MH "united kingdom+") OR (MH "united states+")	Expanders - Apply equivalent subjects Search modes - Find all my search terms	1,730,568
32	S30 NOT S31	Expanders - Apply equivalent subjects Search modes - Find all my search terms	371,635
33	S29 NOT S32	Expanders - Apply equivalent subjects Search modes - Find all my search terms	1,851
34	(MH "Adverse Childhood Experiences+") OR (MH "Autism Spectrum Disorder+") OR (MH "Autistic Disorder+") OR (TI autism) OR (TI autistic) OR (TI biomarker*) OR (TI breastfeed*) OR (TI "diagnostic accuracy") OR (MH Psychometrics+) OR (TI psychometric*) OR (MH "Reproducibility of Results+") OR (TI surgical) OR (TI surgery) OR (TI validation) OR (TI validity) OR (TI yoga)	Expanders - Apply equivalent subjects Search modes - Find all my search terms	390,811
35	S33 NOT S34	Expanders - Apply equivalent subjects Search modes - Find all my search terms	1,614
36	(MH "Systematic Reviews as Topic+") OR (SO "cochrane database syst rev" OR ST "cochrane database syst rev" OR IB "cochrane database syst rev") OR (TI "systematic literature review") OR (TI "systematic review") OR ((TI "systematic review" OR AB "systematic review") AND (PT review)) OR "this systematic review" OR (PT meta-analysis) OR (MH "meta-analysis as topic+") OR (TI meta-analyses OR AB meta-analyses) OR (TI meta-analysis OR AB meta-analysis) OR (TI "meta synthesis" OR AB "meta synthesis") OR (TI "Umbrella Review" OR AB "Umbrella Review")	Expanders - Apply equivalent subjects Search modes - Find all my search terms	231,126
37	S35 AND S36	Expanders - Apply equivalent subjects Search modes - Find all my search terms	107
38	(PT "randomized controlled trial") OR (PT "controlled clinical trial") OR (TI randomized OR AB randomized) OR (TI randomly OR AB randomly) OR (TI trial OR AB trial) OR (TI groups OR AB groups) OR (TI "Phase III" OR AB "Phase III") OR (TI "Phase 3" OR AB "Phase 3")	Expanders - Apply equivalent subjects Search modes - Find all my search terms	1,325,404
39	S35 AND S38	Expanders - Apply equivalent subjects Search modes - Find all my search terms	595

Search #	Query	Limiters/Expanders	Results
40	(MH "Cohort Studies+") OR cohort OR (PT "Clinical Trial") OR follow-up OR Followup OR "different models" OR longitudinal OR (MH "Research Design+") OR (PT "Evaluation Study") OR (PT "Comparative Study") OR ((comparative OR Intervention) AND study) OR "interrupted time*" OR "time serie*" OR intervention* OR ((quasi-experiment* OR quasiexperiment* OR quasi OR experimental) AND (method OR study OR trial OR design*)) OR "real world" OR “real-world”	Expanders - Apply equivalent subjects Search modes - Find all my search terms	1,649,885
41	S35 AND S40	Expanders - Apply equivalent subjects Search modes - Find all my search terms	995
42	S41 NOT ((PT review) OR (PT "meta analysis") OR "case report" OR (MH consensus+) OR (PT guideline) OR "History")	Expanders - Apply equivalent subjects Search modes - Find all my search terms	912
43	(MH "Interrupted Time Series Analysis+") OR TI "interrupted time series" OR AB "interrupted time series" OR TI "repeated measures" OR AB "repeated measures"	Expanders - Apply equivalent subjects Search modes - Find all my search terms	23,413
44	S35 AND S43	Expanders - Apply equivalent subjects Search modes - Find all my search terms	20

Gray Literature Search Strings

ClinicalTrials.Gov

Search date: 4/25/2024
48 results

Condition box:
"Substance-Related Disorders" OR "Mental Health Services" OR "Social Behavior Disorders"[Mesh] OR "mental disorder*" OR "substance abuse" OR "Adjustment Disorders" OR Anorex* OR "Antisocial Personality" OR "behavior disorder*" OR "behaviour disorder*" OR "behavioral health" OR "behavioural health" OR Bipolar OR "Borderline Personality" OR "Capgras Syndrome" OR "Compulsive Personality" OR "Conversion Disorder" OR Cyclothym* OR "Dependent Personality" OR Disruptive Disorder* OR "Impulse Control Disorder*" OR dissociative OR dissociation OR Dyssomnia* OR "Emotional disorder*" OR "Emotion Disorder*" OR Exhibitionis* OR "Factitious Disorder*" OR "Food Addiction" OR "Gender Dysphoria" OR "Histrionic Personality" OR hypochondria* OR hypochondria OR Masochis* OR "mood disorder*" OR "Obsessive-Compulsive Disorder*" OR "Orthorexia Nervosa" OR "Panic Disorder" OR paranoi* OR Paraphili* OR Parasomnia* OR "Passive-Aggressive Personality" OR "Personality Disorder*" OR "Phobic Disorder*" OR phobia* OR "Reactive Attachment" OR Rumination OR Sadis* OR "Schizoid Personality" OR "Schizotypal Personality" OR "Sexual and Gender Disorder*" OR "Sleep Wake Disorder*" OR "social anxiety disorder*" OR "social behavior disorder" OR "social behaviour disorder" OR "Somatoform Disorder*"

Interventions box:
"Mass Screening" OR "Motivational Interviewing" OR "Risk Assessment" OR screening OR screened OR screens OR screenings OR "brief intervention" OR "brief interventions" OR "preventive care" OR "preventive intervention" OR "preventive interventions" OR "preventive behavioral health" OR "preventive mental health" OR "preventive psychosocial" OR "recommended intervention*" OR counseling OR counselling OR counsel OR counseled OR counselled OR counsels OR "Mass Screening" OR "Motivational Interviewing" OR "Risk Assessment" OR screening OR screened OR screens OR screenings OR "brief intervention" OR "brief interventions" OR "preventive care" OR "preventive intervention" OR "preventive interventions" OR "preventive behavioral health" OR "preventive mental health" OR "preventive psychosocial" OR "recommended intervention*" OR counseling OR counselling OR counsel OR counseled OR counselled OR counsels

Other terms box (Implementation terms):
"Community Health Planning" OR "Health Plan Implementation" OR "Implementation Science" OR "implementation strategy" OR "implementation strategies" OR "implementation research" OR "implementation model*" OR "implementation framework*" OR acceptability OR acceptable OR Actionable OR Actionability OR Adoption OR acceptability OR "Quality Improvement" OR QI OR sustainment OR sustainability OR program* OR diffusion or dissemination

Limiters

Limited to Last Update Posted 01/01/2021 – 4/25/2024
Limited to Child checkbox and studies accept healthy volunteers

AHRQ's Academy for Integrating Behavioral Health and Primary Care Website

Search date: 4/25/2024
32 results
("mental health services" OR "substance abuse") AND screening AND implementation* AND prevent* AND (child* OR adolescent*)
Limited to search for only reports and government reports within the gray literature portion of the collection:
Further limited to 2023

MedRXiv

Search date: 4/25/2024
128 results
("mental health services" OR "substance abuse") AND (screen* OR counsel*) AND implementation* AND (primary care)" and posted between "01 Jan, 2010 and 17 Oct, 2023"

Greynet.org

Search date: 4/25/2024
1 result
mental health services AND implementation

TRIP Medical Database

Search date: 4/25/2024
19 results
Simple Search: ("mental health services" OR "substance abuse") AND (screening OR counseling OR counselling) AND implementation* AND prevent* AND (child* OR adolescent*)

Google Advanced Search

Search date: 4/25/2024
Number of results returned not given; saved first 30 results from initial search on 10/17/2023 and additional 30 results from update search on 4/25/2024.

ANY of these words:
"mental health services" "substance abuse"

ALL of the words
screening implementation* prevent*

None of the words:
Adult*

Search English pages

Custom dates: Jan 1, 2010 – Dec 31, 2023

Inclusion and Exclusion Criteria

Table A-5 lists the inclusion and exclusion criteria.

Table A-5. PICOTS inclusion and exclusion criteria

PICOTS	Inclusion	Exclusion
Population at risk	Individuals 18 years of age or younger receiving primary healthcare services (studies with a mix of patients both younger than and older than 18 years of age will be included as long as at least 80% of the population is younger than 21 years of age)[a] Population subgroups: Child/patient age, sex, race/ethnicity, physical or mental disability, socioeconomic status, insurance status/type (mental health coverage), families with low health or limited digital literacy, urban/rural dwelling with limited access to technology or the internet, those living in unstable circumstances, immigrants, refugees, and those with limited English proficiency	Individuals older than 18 years of age

Interventions	Clinical interventions focused on individuals 18 years of age or younger or their caregivers to prevent mental health disorders in populations at risk recommended by
	• Bright Futures Periodicity Schedule
	  – Maternal Depression Screening (for teenage mothers)
	  – Behavioral/Social/Emotional Screening
	  – Tobacco, Alcohol, or Drug Use Assessment
	  – Depression and Suicide Risk Screening
	• USPSTF (including interventions with insufficient evidence)
	  – Screening for Anxiety (B, I Grades)
	  – Screening for Depression and Suicide Risk (B and I Grades)
	  – Screening for Eating Disorders (adolescents only; I Grade)
	  – Counseling regarding unhealthy Drug Use (adolescent only; B and I Grades)
	  – Counseling regarding Illicit Drug Use (I Grade)
	  – Counseling regarding Tobacco Use (B and I Grades)
	  – Counseling regarding Unhealthy Alcohol Use (adolescents only; B and I Grades)
		Clinical interventions
		• Interventions recommended in the Bright Futures Periodicity Schedule or by the USPSTF to prevent developmental disorders
		• Interventions to prevent mental health disorders not recommended in the Bright Futures Periodicity Schedule or by the USPSTF
		• Treatments of mental health disorders

PICOTS	Inclusion	Exclusion
Interventions (continued)	Implementation interventions[b] drawn from the Expert Recommendations for Implementing Change (ERIC)[1] and the Effective Practice and Organisation of Care (EPOC) Taxonomy,[2, 3] including implementation interventions with a Screening, Brief Intervention, and Referral to Treatment (SBIRT) design: • Evaluate and iterate implementation (e.g., conduct needs assessment, assess for readiness; develop implementation plan; develop quality monitoring systems; develop tools for quality monitoring, public reporting, audit, and feedback; conduct cyclical tests of change; obtain and use patient and family feedback; stage implementation scale-up) • Provide interactive assistance (e.g., provide local technical assistance, centralize technical assistance, provide facilitation, provide clinical supervision) • Adapt and tailor to context (e.g., use data experts, use data warehousing techniques, promote adaptability of the intervention, tailor implementation to address barriers and facilitators) • Develop relationships with internal and external partners (e.g., develop academic partnerships, conduct local consensus discussions to partner with community members, build a coalition, obtain formal commitments, use an implementation adviser, visit other sites, change organizational culture, involve executive boards, recruit and train leaders for implementation, use community advisory boards and workgroups, inform local opinion leaders, identify early adopters, identify and prepare champions, model and simulate change, promote network weaving, capture and share local knowledge, develop an implementation glossary) • Train and educate stakeholders (e.g., distribute educational materials, conduct educational meetings, conduct educational outreach visits, shadow other experts, create a learning collaborative, use a train-the-trainer model, conduct ongoing training, provide ongoing consultation) • Support clinicians (e.g., facilitate the relay of clinical data to providers, develop a resource sharing agreement, revise professional roles, create new clinical teams, provide clinicians with reminders) • Engage consumers (e.g., use mass media, increase demand, involve patients and families, intervene with patients and families to enhance intervention uptake and adherence, prepare patients and families to be active participants) • Utilize financial strategies (e.g., access new funding, alter incentive structures, place intervention on fee-for-service lists/formularies, make billing easier, use capitated payments, fund and contract for the intervention, develop disincentives for failure to implement interventions, alter patient fees) • Change infrastructure (e.g., change health system oversight, grow workforce, create or change credentialing or licensure standards, change accreditation or membership requirements, change liability laws, change intervention oversight, mandate change, change physical structure and equipment, change record systems, change service sites, modify workflow and processes, start a dissemination organization)	Implementation interventions • Interventions not designed specifically to support implementation of eligible clinical interventions

PICOTS	Inclusion	Exclusion
Interventions (continued)	Potential effect modifiers: • Setting characteristics: type of setting, type of practice/providers, structure, size, staffing, readiness for implementation, use of health information technology • Care delivery characteristics: accessibility, continuity, timeliness, equitability, cultural competence • Strategy characteristics: complexity, number of components, Intensity/frequency/duration, costs, etc.	
Comparators	• Other implementation strategy • No implementation strategy	No comparator
Outcomes	Implementation outcomes • Appropriateness • Acceptability • Feasibility • Adoption • Implementation costs • Fidelity • Penetration • Sustainability Service outcomes • Rate of referral • Initiation of treatment • Continuity of care • Address a positive screen • Efficiency • Equity/Disparity (KQ 1b) • Opportunity cost of other services • Timeliness • Professional satisfaction • Staff turnover • Clinician burnout Patient outcomes • Functional capacity • Mental health • Progression to diagnosis • Patient satisfaction • Quality of life • Adverse events • Unintended effects other than adverse events (e.g., stigma)	Outcomes not listed
Timing	Studies published in 2010 or later with any length of followup	• Studies published before 2010
Setting(s)	Primary care settings in the United States that traditionally deliver preventive interventions (including pre-visit, in waiting rooms, and during the encounter with clinician) • Primary care practices (including FQHCs) • School-based clinics	• Settings outside of the United States • Urgent care, emergency departments, trauma centers, neonatal intensive care units • Schools (without school-based clinics) • Carceral system settings • Community-based settings

PICOTS	Inclusion	Exclusion
Study Design	Comparative studies that assess the impact of an implementation strategy compared with no strategy or another implementation strategy: • RCT • Nonrandomized controlled studies • Interrupted time series	• Systematic reviews, scoping reviews, and other types of evidence synthesis (will be used for searching reference lists) • Studies without a control group (except interrupted time series) • Pre-post studies • Narrative reviews, editorials, commentaries • Study protocols

[a] Includes clinical interventions focused on caregivers.
[b] May focus on caregivers and providers.
FQHC = Federally Qualified Health Center; KQ = Key Question; PICOTS = population, interventions, comparators, outcomes, timing, and setting; RCT = randomized controlled trial; USPSTF = U.S. Preventive Services Task Force.

Study Selection

We used DistillerSR for literature screening, leveraging its artificial intelligence (AI) capabilities to continually prioritize abstracts with a high likelihood of meeting our inclusion criteria. Two investigators independently screened the top 70 percent of these prioritized abstracts against predefined inclusion and exclusion criteria. For the remaining 30 percent of abstracts, we substituted one investigator with DistillerSR's AI function that had been trained based on the investigator's selections of the dual-screening abstracts. Any discrepancies between human investigators and DistillerSR were resolved through review by an additional investigator. We also employed DistillerSR's AI function to check for screening errors to vet dual exclusions of abstracts. Studies marked for possible inclusion underwent a full-text review. For studies without adequate information to determine inclusion or exclusion, we retrieved the full text. All results were tracked in DistillerSR.

Two trained team members independently reviewed each full-text article for inclusion or exclusion based on the eligibility criteria. If both reviewers agreed that a study did not meet the eligibility criteria, the study was excluded. Conflicts in decisions were resolved by discussion and consensus or by consulting a third member of the review team. We recorded the reasons for exclusions of full-text publications.

Data Extraction

For studies that met our inclusion criteria, we extracted and organized relevant information into evidence tables. To ensure a systematic approach, we designed data extraction forms in DistillerSR to gather pertinent information, including characteristics of study populations, settings, clinical interventions, implementation strategies, comparators, study designs, methods, and results. After the extracted forms were pilot tested, trained reviewers extracted the relevant data from each included article. A second member of the team reviewed data extractions for completeness and accuracy.

Risk of Bias Assessment

Table A-6 presents the definitions of the risk of bias categories.[4]

Table A-6. Definitions of risk of bias categories

Overall Risk of Bias Judgment	Criteria
Low risk of bias	The study is judged to be at low risk of bias for all domains for this result.
Some concerns	The study is judged to raise some concerns in at least one domain for this result, but not to be at high risk of bias for any domain.
High risk of bias	The study is judged to be at high risk of bias in at least one domain for this result. Or The study is judged to have some concerns for multiple domains in a way that substantially lowers confidence in the result.

Data Synthesis and Analysis

Table A-7 presents the framework of implementation strategies, which was adapted from the Expert Recommendations for Implementing Change (ERIC)[1] and Effective Practice and Organisation of Care (EPOC)[2, 3] frameworks.

Table A-7. ERIC and EPOC framework crosswalk and definitions

Category	ERIC Strategy (Definition)	EPOC Strategy (Definition)
Evaluative and Iterative Strategies	Conduct Local Needs Assessment (Collect and analyze data related to the need for the innovation)	N/A
	Assess for Readiness and Identify Barriers and Facilitators (Assess various aspects of an organization to determine its degree of readiness to implement and barriers and strengths that may impede or benefit the implementation effort)	N/A
	Develop a Formal Implementation Blueprint (Develop a formal implementation blueprint including all goals, strategies, and the following: (1) aim/purpose of the implementation; (2) scope of the change (e.g., what organizational units are effected); (3) time frame and milestones; and (4) appropriate performance/progress measures. Use and update this plan to guide the implementation effort over time)	N/A
	Obtain and Use Patient/Consumers and Family Feedback (Develop strategies to increase patient/consumer and family feedback on the implementation effort)	N/A
	Stage Implementation Scale Up (Phase implementation efforts by starting with small pilots or demonstration projects and gradually move to a system-wide rollout)	N/A
Evaluative and Iterative Strategies (continued)	Develop and Implement Tools for Quality Monitoring (Develop, test, and introduce into quality-monitoring systems the right input—the appropriate language, protocols, algorithms, standards, and measures (of processes, patient/consumer outcomes, and implementation outcomes) that are often specific to the innovation being implemented)	N/A

Category	ERIC Strategy (Definition)	EPOC Strategy (Definition)
	Develop and Organize Quality Monitoring Systems (Develop and organize systems and procedures that monitor clinical processes and/or outcomes for the purpose of quality assurance and improvement)	Quality and safety systems (Essential standards for quality of healthcare, and reduction of poor outcomes related to unsafe healthcare) Monitoring the performance of the delivery of healthcare (Monitoring of health services by individuals or healthcare organisations, for example, by comparing with an external standard) Clinical incident reporting (System for reporting critical incidents)
	Audit and Provide Feedback (Collect and summarize clinical performance data over a specified time period and give it to clinicians and admissions to monitor, evaluate, and modify provider behavior)	Audit and feedback (A summary of health workers' performance over a specified period of time, given to them in a written, electronic or verbal format. The summary may include recommendations for clinical action.)
	N/A	Public release of performance data (Informing the public about healthcare providers by the release of performance data in written or electronic form)
	Conduct Cyclical Small Tests of Change (Implement changes in a cyclical fashion using small tests of change before taking changes system-wide; tests of change benefit from systematic measurement, and results of the tests of change are studied for insights on improvement; This process continues serially over time, and refinement is added with each cycle)	Continuous quality improvement (An iterative process to review and improve care that includes involvement of healthcare teams, analysis of a process or system, a structured process improvement method or problem solving approach, and use of data analysis to assess changes)
	Purposefully Reexamine the Implementation (Monitor progress and adjust clinical practices and implementation strategies to continuously improve the quality of care)	N/A
Provide Interactive Assistance	Facilitation (A process of interactive problem solving and support that occurs in a context of a recognized need for improvement and a supportive interpersonal relationship)	N/A
	Provide Clinical Supervision (Provide clinicians with ongoing supervision focusing on the innovation; Provide training for clinical supervisors who will supervise clinicians who provide the innovation)	Managerial supervision (Routine supervision visits by health staff)
	Provide Local Technical Assistance (Develop and use a system to deliver technical assistance focused on implementation issues using local personnel)	N/A
	Centralize Technical Assistance (Develop and use a centralized system to deliver technical assistance focused on implementation issues)	N/A
Adapt and Tailor to Context	N/A	Health conditions (Acute stroke; Acute surgery; Alcohol)
	N/A	Prescribing (Selection of a drug, by a suitably qualified healthcare worker, to treat a patient's health condition)

Category	ERIC Strategy (Definition)	EPOC Strategy (Definition)
	N/A	Disease management (Programs designed to manage or prevent a chronic condition using a systematic approach to care and potentially employing multiple ways of influencing patients, providers or the process of care)
	N/A	Practice and setting (Health promotion in dental settings)
	N/A	Care pathways (Aim to link evidence to practice for specific health conditions and local arrangements for delivering care)
	N/A	Packages of care (Introduction, modification, or removal of packages of services designed to be implemented together for a particular diagnosis/disease, e.g., tuberculosis management guidelines, newborn care protocols)
	Promote Adaptability (Identify ways a clinical innovation can be tailored to meet local needs and clarify which elements of the innovation must be maintained to preserve fidelity)	Tailored interventions (Interventions to change practice that are selected based on an assessment of barriers to change, for example, through interviews or surveys) Group versus individual care (Comparisons of providing care to groups versus individual patients, for example, intensive group therapy, group vs. individual antenatal care)
	Tailor Strategies (Tailor implementation strategies to address barriers and leverage facilitators identified through earlier data collection)	N/A
	Use Data Experts (Involve, hire, and/or consult experts to inform management on the use of data generated by implementation efforts)	N/A
	Use Data Warehousing Techniques (Integrate clinical records across facilities and organizations to aid implementation across systems)	N/A
Develop Relationships		Organisational culture (Strategies to change organisational culture)
	Use an Implementation Advisor (Seek guidance from experts in implementation)	N/A
	Develop Academic Partnerships (Partner with a university or academic unit for the purposes of shared training and bringing research skills to an implementation project)	N/A
	Recruit, Designate, and Train for Leadership (Recruit, designate, and train leaders for the change effort)	N/A
	Build a Coalition (Recruit and cultivate relationships with partners in the implementation effort)	Community mobilization (Processes that enable people to organize themselves)
Develop Relationships (continued)	Use Advisory Boards and Workgroups (Create and engage a formal group of multiple kinds of stakeholders to provide input and advice on implementation efforts and to elicit recommendations for improvements)	N/A

Category	ERIC Strategy (Definition)	EPOC Strategy (Definition)
	Involve Executive Boards (Involve existing governing structures (e.g., boards of directors, medical staff boards of governance) in the implementation effort, including the review of data on implementation processes)	N/A
	Develop an Implementation Glossary (Develop and distribute a list of terms describing the innovation, implementation, and stakeholders in the organizational change)	N/A
	Conduct Local Consensus Discussions (Include local providers and other stakeholders in discussions that address whether the chosen problem is important and whether the clinical innovation to address it is appropriate)	Local consensus processes (Formal or informal local consensus processes, for example, agreeing on a clinical protocol to manage a patient group, adapting a guideline for a local health system or promoting the implementation of guidelines)
	Obtain Formal Commitments (Obtain written commitments from key partners that state their efforts to implement the innovation)	Multi-institutional arrangements (Policies for how multiple organizations work together: policies that regulate interactions between donors and governments, social franchising, governance arrangements for coordinating care across multiple providers, mergers, collaborations between local health and local government agencies for health improvement)
	Visit Other Sites (Encourage educational institutions to train clinicians in the innovation)	N/A
	Capture and Share Local Knowledge (Capture local knowledge from implementation sites on how implementers and clinicians made something work in their setting and then share it with other sites)	N/A
	Inform Local Opinion Leaders (Inform providers identified by colleagues as opinion leaders or “educationally influential” about the clinical innovation in the hopes that they will influence colleagues to adopt it)	Local opinion leaders (The identification and use of identifiable local opinion leaders to promote good clinical practice)
	Identify and Prepare Champions (Identify and prepare individuals dedicated to supporting, marketing, and driving through an implementation, overcoming indifference or resistance that the intervention may provoke in an organization)	N/A
	Identify Early Adopters (Identify early adopters at the local site to learn from their experiences with the practice innovation)	N/A
	Model and Simulate Change (Model or simulate the change that will be implemented prior to implementation)	N/A
	Organize Clinician Implementation Team Meetings (Cultivate teams of clinicians who implement the innovation and give them protected time to reflect on the implementation effort, share lessons learned, and support one another’s learning)	N/A

Category	ERIC Strategy (Definition)	EPOC Strategy (Definition)
Develop Relationships (continued)	Promote Network Weaving (Identify and build on existing high-quality working relationships and networks within and outside the organization, organizational units, teams, etc.)	Communication between providers (Systems or strategies for improving the communication between health care providers, for example systems to improve immunization coverage in LMIC) Referral systems (Systems for managing referrals of patients between health care providers) Shared care (Continuing collaborative clinical care between primary and specialist care physicians) Transition of Care (Interventions to improve transition from one care provider to another, for example, adolescents moving from child to adult health services) Communities of practice (Groups of people with a common interest who deepen their knowledge and expertise in this area by interacting on an ongoing basis)
	N/A	Exit interviews (A verbal exchange or written questionnaire between employees' resignation and last working day)
Train and Educate	Develop Educational Materials (Develop and format manuals, toolkits, and other supporting materials in ways that make it easier for stakeholders to learn about the innovation and for clinicians to learn how to deliver the clinical innovation)	Clinical Practice Guidelines (Clinical guidelines are systematically developed statements to assist healthcare providers and patients to decide on appropriate health care for specific clinical circumstances' (US IOM))
	Distribute Educational Materials (Distribute educational materials (including guidelines, manuals, and toolkits) in person, by mail, and/or electronically)	Educational materials (Distribution to individuals, or groups, of educational materials to support clinical care, i.e., any intervention in which knowledge is distributed--for example this may be facilitated by the internet, learning critical appraisal skills; skills for electronic retrieval of information, diagnostic formulation; question formulation)
	Conduct Educational Meetings (Hold meetings aimed at various stakeholder groups (e.g., providers, administrators, other organizational stakeholders, and community, patient/consumer, and family stakeholders) to teach them about the clinical innovation)	Educational meetings (Courses, workshops, conferences or other educational meetings)
	Conduct Educational Outreach Visits (Have a trained person meet with providers in their practice settings to educate providers about the clinical innovation with the intent of changing the provider's practice)	Educational outreach visits, or academic detailing. (Personal visits by a trained person to health workers in their own settings, to provide information with the aim of changing practice)
	Shadow Other Experts (Provide ways for key individuals to directly observe experienced people engage with or use the targeted practice change/innovation)	
	Make Training Dynamic (Vary information delivery methods to cater to different learning styles and work contexts, and shape the training in the innovation to be interactive)	Educational games (The use of games as an educational strategy to improve standards of care)

Category	ERIC Strategy (Definition)	EPOC Strategy (Definition)
Train and Educate (continued)	Use Train-the-Trainer Strategies (Train designated clinicians or organizations to train others in the clinical innovation)	N/A
	Conduct Ongoing Training (Plan for and conduct training in the clinical innovation in an ongoing way)	N/A
	Provide Ongoing Consultation (Provide ongoing consultation with experts in strategies used to support innovation implementation)	N/A
	Create a Learning Collaborative (Facilitate formation of groups of providers or provider organizations and foster a collaborative learning environment to improve implementation of the clinical innovation)	N/A
	Work with Educational Institutions (Encourage educational institutions to train clinicians in the innovation)	Pre-licensure education (Changes in pre-licensure education of health professionals) Inter-professional education (Continuing education for health professionals that involves more than one profession in joint, interactive learning)
Support Clinicians	Develop Resource Sharing Agreements (Develop partnerships with organizations that have resources needed to implement the innovation)	Recruitment and retention strategies for underserved areas (Strategies for recruiting and retaining health workers in underserved areas)
	Revise Professional Roles (Shift and revise roles among professionals who provide care, and redesign job characteristics)	Role expansion or task shifting (Expanding tasks undertaken by a cadre of health workers or shifting tasks from one cadre to another, to include tasks not previously part of their scope of practice)
	Create New Clinical Teams (Change who serves on the clinical team, adding different disciplines and different skills to make it more likely that the clinical innovation is delivered (or is more successfully delivered))	Coordination of care amongst different provider (Organizing different providers and services to ensure timely and efficient delivery of healthcare) Size of organizations (Increasing or decreasing the size of health service provider units) Staffing models (Interventions to achieve an appropriate level and mix of staff, recruitment and retention of staff, and transitioning of healthcare workers from one environment to another, for example, interventions to increase the proportion of healthcare workers in underserved areas) Teams (Creating and delivering care through a multidisciplinary team of healthcare workers)
	Remind Clinicians (Develop reminder systems designed to help clinicians to recall information and/or prompt them to use the clinical innovation)	Reminders (Manual or computerised interventions that prompt health workers to perform an action during a consultation with a patient, for example, computer decision support systems)
	Facilitate Relay of Clinical Data to Providers (Provide as close to real-time data as possible about key measures of process/outcomes using integrated modes/channels of communication in a way that promotes use of the targeted innovation)	Routine patient-reported outcome measures (Routine administration and reporting of patient-reported outcome measures to providers and/or patients)

Category	ERIC Strategy (Definition)	EPOC Strategy (Definition)
Engage Consumers	Involve Patients/Consumers and Family Members (Engage patients/consumers and families in the implementation effort)	N/A
	Intervene with Patients/Consumers to Enhance Uptake and Adherence (Develop strategies with patients to encourage and problem solve around adherence)	Comprehensive geriatric assessment (A multidimensional interdisciplinary diagnostic process focused on determining a frail older person's medical, psychological and functional capability to ensure that problems are identified, quantified and managed appropriately)
	Prepare Patients/Consumers to be Active Participants (Prepare patients/consumers to be active in their care, to ask questions, and specifically to inquire about care guidelines, evidence for clinical decisions, or about available evidence-supported treatments)	Shared decision-making (Sharing healthcare decision making responsibilities among different individuals, potentially including the patient) Self-management (Shifting or promoting the responsibility for healthcare or disease management to the patient and/or their family) Patient-initiated appointment systems (Systems that enable patients to make urgent appointments when they feel they cannot manage their condition or where something has changed unexpectedly) Smart home technologies (Electronic assistive technologies) Patient-mediated interventions (Any intervention aimed at changing the performance of healthcare professionals through interactions with patients, or information provided by or to patients)
	Increase Demand (Attempt to influence the market for the clinical innovation to increase competition intensity and to increase the maturity of the market for the clinical innovation)	N/A
	Use Mass Media (Use media to reach large numbers of people to spread the word about the clinical innovation)	N/A
Utilize Financial Strategies	Fund and Contract for the Clinical Innovation (Governments and other payers of services issue requests for proposals to deliver the innovation, use contracting processes to motivate providers to deliver the clinical innovation, and develop new funding formulas to prompt providers to deliver the innovation)	Contracting out health services (Contracting is a strategy to use public sector funds to finance the provision of healthcare services)
	Access New Funding (Access new or existing money to facilitate the implementation)	External funding (Financial contributions such as donations, loans, etc. from public or private entities from outside the national or local health financing system)

Category	ERIC Strategy (Definition)	EPOC Strategy (Definition)
Utilize Financial Strategies (continued)	Alter Incentive/Allow Structures (Work to incentivize the adoption and implementation of the clinical innovation)	Payment methods for health workers (Fee for services, capitation, salary) Pay for performance – target payments (Transfer of money or material goods to healthcare providers conditional on taking a measurable action or achieving a predetermined performance target, for example incentives for lay health workers) Fund holding (Budgets allocated to a group or individual providers to purchase services with financial rewards for underspending or penalties for overspending (includes indicative budgets))
	Place Innovation on Fee for Service Lists/Formularies (Work to place clinical innovation on lists of actions for which providers can be reimbursed (e.g., a drug is placed on a formulary, a procedure is now reimbursable))	Pricing and purchasing policies (Policies that determine the price that is paid or how commercial products are purchased, for example, health technologies, drugs) Insurance (Policies that regulate the provision of insurance, for example, insurance coverage of essential drugs) Decision-making about what or who is covered (Processes for deciding what is reimbursed and who is covered by health insurance: policies that regulate what drugs are reimbursed, policies that regulate what services are reimbursed, restrictions on reimbursement for health insurance, strategies for expanding health insurance coverage)
	Make Billing Easier (Make it easier to bill for the clinical innovation)	Method of paying healthcare organisations (Global budgets, employer based insurance schemes, line- item budgets; case-based reimbursement; pay for performance; mixed payment)
	Use Capitated Payments (Pay providers or care systems a set amount per patient/consumer for delivering clinical care)	N/A
	Develop Disincentives (Provide financial disincentives for failure to implement or use the clinical innovations)	Disincentives (Provide financial disincentives for failure to implement or use the clinical innovations)

Category	ERIC Strategy (Definition)	EPOC Strategy (Definition)
Utilize Financial Strategies (continued)	Alter Patient/Consumer Fees (Create fee structures where patient/consumers pay less for preferred treatments (the clinical innovation) and more for less-preferred treatments)	User fees or out of pocket payments (Charges levied on any aspect of health services at the point of delivery) Caps and co-payments for drugs of health services (Direct patient payments for part of the cost of drugs or health services) Health savings accounts (Prepayment schemes for individuals or families without risk pooling) Prepaid funding (Collection of funds through general tax revenues versus earmarked tax revenues versus employer payments versus direct payments) Community based health insurance (A scheme managed and operated by an organization, other than a government or private for-profit company, that provides risk pooling to cover all or part of the costs of health care services) Private health insurance (Private for-profit health insurance) Conditional cash transfers (Monetary transfers to households on the condition that they comply with pre-defined requirements for healthcare)
	Use Other Payment Schemes (Introduce payment approaches (in a catch-all category))	Community loan funds (Funds generated from contributions of community members that families can borrow to pay for emergency transportation and hospital costs) Social health insurance (Compulsory insurance that aims to provide universal coverage) Voucher schemes (Provision of vouchers that can be redeemed for health services at specified facilities)
Change Infrastructure	N/A	Decentralisation and centralisation (Decentralised versus centralised authority for health services. For example government regulation of health insurance; regional vs. national management of health budgets on efficiency and effectiveness of healthcare)
	N/A	Stewardship of private health services (Policies that regulate health services provided by the private sector)
	Change Liability Laws (Participate in liability reform efforts that motivate clinicians to deliver the clinical innovation)	Liability of healthcare organisations (Policies that limit liability of healthcare organisations, for example, risk management) Liability for commercial products (Policies that regulate liability for commercial products) Professional liability (Policies that regulate liability for health professionals)

Category	ERIC Strategy (Definition)	EPOC Strategy (Definition)
Change Infrastructure (continued)	N/A	Policies to reduce corruption (Regulations that are intended to reduce corruption in the health sector)
	N/A	Policies to manage absenteeism (Regulations for managing absenteeism)
	N/A	Ownership (Policies that regulate who can own health service organizations, for example, for-profit vs. not-for-profit; public vs. private)
	N/A	Incentives for career choices (Financial or material rewards for career choices; e.g., choice of profession or primary care)
	N/A	Emigration and immigration policies (Policies that regulate emigration and immigration of health professionals)
	N/A	Movement of health workers between public and private care (Strategies for managing the movement of health workers between public and private organizations)
	N/A	Dual practice (Policies that regulate dual practice, e.g., working in public and privately owned healthcare settings)
	Create or Change Credentialing and/or Licensure Standards (Create an organization or encourage an existing organization to certify clinicians in the innovation; Change governmental professional certification or licensure requirements to include delivering the innovation; Work to alter continuing education requirements to shape professional practice toward the innovation)	Training and licensing (Policies that regulate training, specialty certification and licensure) Scope of practice (Policies that regulate what health professionals can do)
	Change Accreditation or Membership Requirements (Strive to alter accreditation standards so that they require or encourage use of the clinical innovation; Work to alter membership organization requirements so that those who want to affiliate with the organization are encouraged or required to use the clinical innovation)	Accreditation (Processes for accrediting healthcare providers) Authority and accountability for quality of practice (Policies that regulate authority and accountability for the quality of care or safety, for example, implementation of clinical guidelines) Professional competence (Policies or procedures for assuring professional competence)
	N/A	Stakeholder involvement in policy decisions (Policies and procedures for involving stakeholders in decision-making)
	N/A	Patients' rights (Policies that regulate patients' rights, including access to care and information--includes regulation of information provided to patients)
	N/A	Patents and profits (Policies that regulate patents and profits, for example, medical devices, drugs)
	N/A	Registration (Procedures for registering or licensing commercial products, for example, medical devices, drugs)
	N/A	Sales and dispensing (Policies that regulate sales and dispensing of commercial products, for example, over the counter and prescription drugs.,)

Category	ERIC Strategy (Definition)	EPOC Strategy (Definition)
Change Infrastructure (continued)	N/A	Procurement and distribution of supplies (Systems for procuring and distributing drugs or other supplies)
	N/A	Marketing regulations (Policies that regulate marketing of commercial products, for example medical devices, drugs, the private provision of healthcare)
	Start a Dissemination Organization (Identify or start a separate organization responsible for disseminating the clinical innovation; It could be a for-profit or non-profit organization)	N/A
	Mandate Change (Have leadership declare the priority of the innovation and their determination to have it implemented)	N/A
	Change Physical Structure and Equipment (Evaluate current configurations and adapt, as needed, the physical structure and/or equipment (e.g., changing the layout of a room, adding equipment) to best accommodate the targeted innovation)	Environment (Changes to the physical or sensory healthcare environment, by adding or altering equipment or layout, providing music, art)
	Change Service Sites (Change the location of clinical service sites to increase access)	Site of service delivery (Changes in where care is provided, for example home vs. healthcare facility, inpatient vs. outpatient, specialized vs. non-specialized facility, walk in clinics, medical day Transportation services (Arrangements for transporting patients from one site to another) Integration (Consolidating the provision of different healthcare services to one (or simply fewer) facilities) Telemedicine (Exchange of healthcare information from one site to another via electronic communication)
	Change Record Systems (Change records systems to allow better assessment of implementation or clinical outcomes)	The use of information and communication technology (Technology based methods to transfer healthcare information and support the delivery of care) Health information systems (Health record and health management systems to store and manage patient health information, for example, electronic patient records, or systems for recalling patients for follow-up or prevention e.g., immunization)
	N/A	Queuing strategies (A reduction or increase in time to access a healthcare intervention, for example, managed waiting lists, managing ER wait time)
	N/A	Triage (Management of patients attending a healthcare facility, or contacting a healthcare professional by phone, and receiving advice or being referral to an appropriate service)
	N/A	Length of consultation (Changes in the length of consultations)

Category	ERIC Strategy (Definition)	EPOC Strategy (Definition)
Change Infrastructure (continued)	N/A	Case management (Introduction, modification or removal of strategies to improve the coordination and continuity of delivery of services i.e., improving the management of one "case" (patient))

EPOC = Effective Practice and Organisation of Care; ERIC = Expert Recommendations for Implementing Change; N/A = not applicable; vs. = versus.

Grading the Strength of the Body of Evidence

Technical Expert Panel (TEP) members rated the relative importance of eligible outcomes on a Likert scale from 1 to 9, where 1 is the least important and 9 the most important for decision-making. **Table A-8** presents the results of the ratings.

Table A-8. TEP ratings of the relative importance of outcomes

Outcome	Mean	Median	Standard Deviation	Outcome Type
Equity[a]	8.7	9.0	0.7	Service
Address a positive screen (other than through initiation of treatment)[a]	8.6	9.0	1.0	Service
Mental health[a]	8.5	9.0	0.8	Patient
Acceptability[a]	8.3	8.0	0.7	Implementation
Quality of life[a]	8.3	8.0	0.7	Patient
Adverse events[a]	8.3	9.0	1.1	Patient
Feasibility[a]	8.1	8.0	1.0	Implementation
Functional capacity	8.1	8.0	0.9	Patient
Patient satisfaction	8	8.5	1.2	Patient
Sustainability[a]	7.9	8.0	0.9	Implementation
Initiation of treatment[a]	7.6	8.0	1.8	Service
Unintended effects other than adverse events (e.g., stigma)	7.6	8.0	1.3	Patient
Adoption	7.5	7.5	1.5	Implementation
Fidelity	7.5	7.5	1.5	Implementation
Continuity of care	7.5	7.0	1.4	Service
Appropriateness	7.4	8.0	2.1	Implementation
Progression to diagnosis	7.4	7.5	1.0	Patient
Timeliness	7	7.0	1.2	Service
Efficiency	6.9	7.0	1.4	Service
Professional satisfaction	6.6	7.0	1.4	Service
Opportunity cost of other services	6.5	7.0	1.6	Service
Reach[a]	6.4	7.0	2.0	Implementation
Rate of referral	6.4	6.0	1.9	Service
Clinician burnout	6.3	6.0	1.9	Service
Implementation Costs	6.2	6.0	1.4	Implementation
Staff turnover	5.6	5.5	2.0	Service

[a] Outcomes that were selected for grading strength of evidence based on the TEP's mean rating or by the review team's determination of the outcome's importance to the topic.
TEP = Technical Expert Panel.

Two trained reviewers assessed each Grading of Recommendations Assessment, Development and Evaluation (GRADE) domain for each outcome, differences were resolved by consensus. One of the two reviewers was a senior researcher with experience in grading the strength of evidence (SOE). We used the Guideline Development Tool (http://www.guidelinedevelopment.org/) to grade the SOE in a standardized manner and to develop Summary of Findings tables. For this review, we used a minimally contextualized approach.[5] For judging imprecision, we used the null (no effect) as a threshold for benefits and harms. The definitions of the grades and overall strength of evidence ratings are included in **Table A-9.**

Table A-9. Definitions of the grades of overall strength of evidence[5]

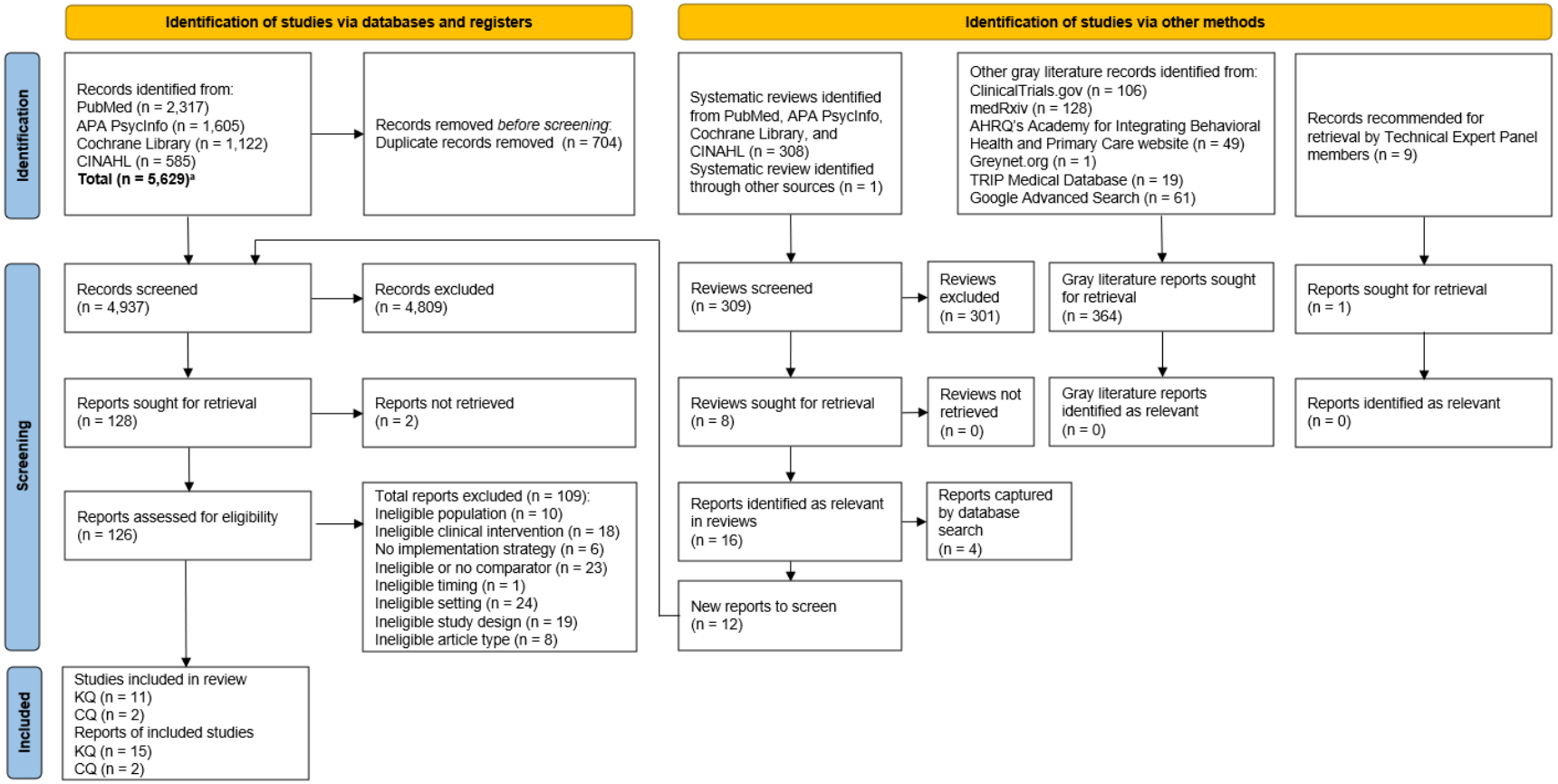
Grade	Definition
High	We are very confident that the estimate of effect lies close to the true effect for this outcome. The body of evidence has few or no deficiencies. We believe that the findings are stable (i.e., another study would not change the conclusions).
Moderate	We are moderately confident that the estimate of effect lies close to the true effect for this outcome. The body of evidence has some deficiencies. We believe that the findings are likely to be stable, but some doubt remains.
Low	We have limited confidence that the estimate of effect lies close to the true effect for this outcome. The body of evidence has major or numerous deficiencies (or both). We believe that additional evidence is needed before concluding either that the findings are stable or that the estimate of effect is close to the true effect.
Very low	We have no evidence, we are unable to estimate an effect, or we have no confidence in the estimate of effect for this outcome. No evidence is available, or the body of evidence has unacceptable deficiencies, precluding reaching a conclusion.

Appendix B. Results

Results of Literature Searches

Database searches, hand searches of relevant systematic reviews, and gray literature searches identified 4,937 unique records. Among those, 4,809 were excluded at title and abstract review and the remaining 128 were eligible for full-text review, of which 126 were retrieved and reviewed. Among those, 109 were excluded: 10 for ineligible population, 18 for ineligible clinical intervention, 6 for no implementation strategy, 23 for ineligible or no comparator, 1 for ineligible timing, 24 for ineligible setting, 19 for ineligible study design, and 8 for ineligible article type. In total, 13 studies reported in 17 publications were included. The final row of **Figure B-1** shows 11 studies in 15 publications were included for Key Question (KQ) 1 and 2 studies were included for Contextual Question (CQ) 1.

Figure B-1. Literature flow diagram


Identification of studies via databases and registers
Identification of studies via other methods
Identification
Screening
Included
Records identified from:
PubMed (n = 2,317)
APA PsycInfo (n = 1,605)
Cochrane Library (n = 1,122)
CINAHL (n = 585)
Total (n = 5,629)a
Records removed before screening:
Duplicate records removed (n = 704)
Systematic reviews identified from PubMed, APA PsycInfo, Cochrane Library, and CINAHL (n = 308)
Systematic review identified through other sources (n = 1)
Other gray literature records identified from:
ClinicalTrials.gov (n = 106)
medRxiv (n = 128)
AHRQ's Academy for Integrating Behavioral Health and Primary Care website (n = 49)
Greynet.org (n = 1)
TRIP Medical Database (n = 19)
Google Advanced Search (n = 61)
Records recommended for retrieval by Technical Expert Panel members (n = 9)
Records screened
(n = 4,937)
Records excluded
(n = 4,809)
Reviews screened
(n = 309)
Reviews excluded
(n = 301)
Gray literature reports sought for retrieval
(n = 364)
Reports sought for retrieval
(n = 1)
Reports sought for retrieval
(n = 128)
Reports not retrieved
(n = 2)
Reviews sought for retrieval
(n = 8)
Reviews not retrieved
(n = 0)
Gray literature reports identified as relevant
(n = 0)
Reports identified as relevant
(n = 0)
Reports assessed for eligibility
(n = 126)
Total reports excluded (n = 109):
Ineligible population (n = 10)
Ineligible clinical intervention (n = 18)
No implementation strategy (n = 6)
Ineligible or no comparator (n = 23)
Ineligible timing (n = 1)
Ineligible setting (n = 24)
Ineligible study design (n = 19)
Ineligible article type (n = 8)
Reports identified as relevant in reviews
(n = 16)
Reports captured by database search
(n = 4)
New reports to screen
(n = 12)
Studies included in review
KQ (n = 11)
CQ (n = 2)
Reports of included studies
KQ (n = 15)
CQ (n = 2)

[a] Database search yielded 490 trial registry (gray literature) records, all of which were excluded during screening.

AHRQ = Agency for Healthcare Research and Quality; APA = American Psychological Association; CINAHL = Cumulative Index to Nursing and Allied Health Literature; CQ = Contextual Question; KQ = Key Question; n = number; TRIP = Turning Research Into Practice.

Description of Included Studies

Key Question 1

Detailed Study and Population Characteristics

Detailed study and population characteristics for included studies are reported by clinical area in **Table B-1**, **Table B-2**, **Table B-3**, and **Table B-4**.

Table B-1. Detailed study and population characteristics of included studies on screening for depression

Author, Year Trial Name Study Design Trial Registry Number Funder/Sponsor Risk of Bias	Clinical Intervention, Goal of Implementation Intervention	Implementation Intervention and Comparator (N Practices, N Providers, N Patients)	Population of Focus	Patient Age, Sex	Setting Type	Implementation Period	Other Population Characteristics
Dalal, 2023[6] Nonrandomized controlled trial Not registered Fuss Family Fund; Reliant Medical Group Risk of bias: High	**Depression and suicide risk screening** Implement a 2-stage depression screening and followup process in line with the 2-part AAP guideline	Intervention: **Support clinicians** (9 practices, 18 providers, 891 patients) Comparator: **No implementation strategy** (9 practices, 14 providers, 1,721 patients)	Adolescents ages 12 to 18 years screening at risk for depression on the PSC-17	Mean age (SD): 14.86 years (1.72) N (%) Female 1,302 (49.2%)	Primary care physicians at 9 pediatric primary care practices in the RMG private practice network in Central and MetroWest Massachusetts	3 months	Race/ethnicity Hispanic: 247 (15.4%) Non-Hispanic (n=1,608) 1,361 (84.6%) Asian: 179 (8.7%) Black: 125 (6.1%) Native American: 29 (1.4%) White (n=2,054): 1,721 (83.8%) Preferred language English: 2,474 (94.0%) Spanish: 89 (3.4%) Other (n=2,632): 69 (2.6%)
Harder, 2019[7] Nonrandomized controlled trial Registry number NR State of Vermont Risk of bias: High	**Depression and suicide risk screening** Increase adolescent depression screening and initial plans of care among those screening positive	Intervention: **Learning collaborative** (17 practices, providers NR, 792 patients) Comparator: **No implementation strategy** (21 practices, providers NR, 772 patients)	12- to 18-year-old patients attending a health supervision visit	Age range: 14 to 16 years N (%) Female Intervention: 416 (53%), Comparator strategy: 397 (51%)	Physicians, nurses at pediatric and family medicine practices (Vermont Child Health Improvement Program's CHAMP QI network)	19 months (7 months implementation period and 1-year followup)	Not reported Medicaid Intervention: 263 (33%) Comparator: 306 (40%) In largest metropolitan area Intervention: 375 (47%) Comparator: 237 (31%) Federally qualified/certified rural Intervention: 86 (11%) Comparator: 217 (28%)

Author, Year Trial Name Study Design Trial Registry Number Funder/Sponsor Risk of Bias	Clinical Intervention, Goal of Implementation Intervention	Implementation Intervention and Comparator (N Practices, N Providers, N Patients)	Population of Focus	Patient Age, Sex	Setting Type	Implementation Period	Other Population Characteristics
Baum 2020[8] Interrupted time series (Quality Improvement Centerline Shift Analysis) Not registered Funding NR Risk of bias: High	**Depression and suicide risk screening** Deliver a depression management bundle that includes evidence-based depression screening, brief supportive counseling ("first-line advice"), referral, consultation, and/or medication, as well as planned followup with primary care or mental health specialists (depending on patients' depression symptom severity) within a specific time frame	Intervention: **Learning collaborative** (4 practices, 22 providers, 1,768 patients) **No comparator**	Patients ages 11 to 18 years seen at 1 of 4 rural Ohio pediatric primary care practices	Not reported	Clinic providers at 1 of 4 rural Ohio pediatric primary care clinics that belonged to a pediatric accountable care organization	6 months	Not reported Health insurance status % Medicaid patients at participating practices Practice 1: 48% Practice 2: 40% Practice 3: 60% Practice 4: 40%

AAP = American Academy of Pediatrics; CHAMP = Child Health Advances Measured In Practice; N = number; NR = not reported; PHQ-9 = Patient Health Questionnaire; PSC-17 = Pediatric Symptom Checklist; PSC-INT = Pediatric Symptom Checklist internalizing subscale; PSC-OVR = Pediatric Symptom Checklist overall psychosocial functioning; QI = quality improvement; RMG = Reliant Medical Group; SD = standard deviation.

Table B-2. Detailed study and population characteristics for included studies on eating disorders

Author, Year Trial Name Study Design Trial Registry Number Funder/Sponsor Risk of Bias	Clinical Intervention, Goal of Implementation Intervention	Implementation Intervention and Comparator (N Practices, N Providers, N Patients)	Population of Focus	Patient Age, Sex	Setting Type	Implementation Period	Other Population Characteristics
Gooding, 2017[9] Study design: Nonrandomized controlled trial Registry number: NR Funder/Sponsor: Academy for Eating Disorders Medical Care Guidelines Grant; Ellen Feldberg Gordon Challenge Fund for Eating Disorders Research and the Strategic Training Initiative for the Prevention of Eating Disorders Risk of bias: High	**Screening for eating disorders** Improve screening based on the Academy for Eating Disorders (AED) medical guide "Eating Disorders: Critical Points for Early Recognition and Medical Risk Management in the Care of Individuals with Eating Disorders"	Intervention: **Learning collaborative**[a] (practices NR, 23 providers, 509 patients) Comparator: **Educational materials** (practices NR, 280 providers, 7,592 patients)	Patients ages 10 to 21 years seen for a well visit Patients considered high risk for eating disorders if BMI percentile was below the 5th percentile for age and sex or because drop in BMI since prior year's checkup was in the largest 5% of BMI reductions in the study population	Age range: 10 to 21 years Female: NR	Primary care practitioners, including physicians, nurse practitioners, and physician assistants at pediatric primary care practices in Eastern Massachusetts	8 months (1-month pre-period, 2-month gap, 4-month intervention period, 1-month followup)	NR

[a] This study was conducted among practices that participate in the Pediatric Physicians' Organizations at Childrens (PPOC), who are required to participate in at least one learning collaborative per year. The Learning Collaborative from this study implemented an active-learning intervention to compare to a print-learning intervention.
AED = Academy for Eating Disorders; BMI = body mass index; N = number, NR = not reported.

Table B-3. Detailed study and population characteristics for included studies on substance use disorders

Author, Year Trial Name Study Design Trial Registry Number Funder/Sponsor Risk of Bias	Clinical Intervention, Goal of Implementation Strategy	Intervention and Comparator(s) (N)	Population of Focus	Patient Age and Sex	Setting/Clinic Type	Implementation Period	Other Population Characteristics
Knight, 2019[10] Gibson, 2021[11] Randomized controlled trial NCT00227877 NIH National Institute on Alcohol Abuse and Alcoholism, HRSA Maternal and Child Health Risk of bias: Some concerns	**Tobacco, alcohol, or drug use assessment** Implement a computer-facilitated screening and brief intervention (cSBI) with a self-administered screening questionnaire (CRAFFT) and immediate personalized feedback, psychoeducation, reminders, and talking points for pracitioners	Intervention: **Clinician support** (5 practices, 54 providers allocated [49 analyzed], 628 patients allocated [626 analyzed]) Comparator: **Technology only** (5 practices, 54 providers allocated [49 analyzed], 243 patients allocated [243 analyzed])	Youth ages 12 to 18 years who presented for annual preventive health visits Patients who reported any substance use or riding risk at baseline comprised the intervention effect cohort; patients who reported no substance use or riding risk comprised the prevention effect cohort	Mean (SD) age: 14.3 years (1.8) N (%) Female: 326 (49.6%)	Pediatric practitioners: nurse practitioners and physicians at pediatric primary care, including 3 community practices and 2 hospital-based practices in Boston, Massachusetts	2 years, 11 months	N (%) Race/ethnicity White/non-Hispanic: 282 (42.9%) Hispanic: 201 (30.5%) Other/multi-race: 176 (26.6%) Two parents at home: 523 (80.0%) College graduate parents: 414 (71.5%) Saw pediatrician at visit: 564 (85.7%) Had 6 or more visits with clinician: 390 (59.6%) Rode with a driver who had been using alcohol or drugs: 43 (6.5%) Hangs out with any friends that use alcohol and drugs: 251 (38.1%) Substance-involved siblings: 50 (8.9%) Substance-involved parents: 35 (5.3%)

Author, Year Trial Name Study Design Trial Registry Number Funder/Sponsor Risk of Bias	Clinical Intervention, Goal of Implementation Strategy	Intervention and Comparator(s) (N)	Population of Focus	Patient Age and Sex	Setting/Clinic Type	Implementation Period	Other Population Characteristics
Mitchell, 2020[12] Barbosa, 2022[13] Gryczynski, 2023[14] SBIRT Implementation for Adolescents in Urban Federally Qualified Health Centers (ST@T) Cluster randomized controlled trial NCT01829308 National Institute on Drug Abuse Risk of bias: Low	**Tobacco, alcohol, or drug use assessment, counseling regarding unhealthy drug use, counseling regarding illicit drug use, counseling regarding unhealthy alcohol use** Deliver brief advice from PCP and immediate referral to the behavioral health counselor for patients who scored 2 or more on the CRAFFT	Intervention: **Behavioral health incorporation** (3 practices, 15 providers, 5,406 patient visits) Comparator: **Clinician support only** (4 practices, 12 providers, 4,233 patient visits)	Adolescents, ages 12 to 17 years, receiving care at 1 of 7 sites within a FQHC in Baltimore City	Mean (SD) age Intervention: 14.2 years (1.7) Comparator: 14.4 years (1.7) % Female Intervention: 54.6% Comparator: 56.5%	Pediatric and family medicine PCPs and BHCs at Large, urban FQHC, which provided adolescent medicine to approximately 3,600 patients at its 7 sites throughout Baltimore City	20-month implementation period for screening and brief advice; 14-month period for brief intervention analysis (data on BHC-delivered BI was not available prior to transition to a new EHR in Month 6)	NR

Author, Year Trial Name Study Design Trial Registry Number Funder/Sponsor Risk of Bias	Clinical Intervention, Goal of Implementation Strategy	Intervention and Comparator(s) (N)	Population of Focus	Patient Age and Sex	Setting/Clinic Type	Implementation Period	Other Population Characteristics
Sterling, 2015[15] The Screening for Youth Alcohol and Drug Use: A Study of Primary Care Providers Cluster randomized controlled trial NCT02408952 National Institute on Alcohol Abuse and Alcoholism Risk of bias: Some concerns	**Tobacco, alcohol, or drug use assessment, depression and suicide risk screening, counseling regarding unhealthy drug use, counseling regarding illicit drug use, counseling regarding unhealthy alcohol use** Provide pediatricians with access to a BHCP (licensed clinical psychologist) for additional support to patients who endorsed substance use or mental health risk during screening while patients were at visit	Intervention: **Behavioral health incorporation plus clinician support** (practices NR, 17 providers allocated [16 analyzed], 1,558 patients allocated [671 analyzed]) Comparator: **Clinician support only** (practices NR, 17 providers allocated [14 analyzed], 1,558 patients allocated [584 analyzed]) Comparator: **No implementation strategy** (practices NR, 18 providers allocated [16 analyzed], 1,769 allocated [616 analyzed])	Adolescent patients ages 12 to 18 years	Mean age: 15 years N (%) Female: 2,695 (52.0%)	Pediatricians, behavioral healthcare providers at large general pediatrics clinic in an integrated healthcare system (Kaiser Permanente Northern California Oakland)	24 months	N (%) Race/ethnicity White 1,120 (21.6%) Black 1,659 (32.0%) Hispanic 1,130 (21.8%) Asian 933 (18.0%) Other or missing 342 (6.6%) N/A

BHC = behavioral health counselor; BHCP = behavioral health care practitioner; CRAFFT = car, relax, alone, forget, family or friends, trouble; EHR = electronic health record; FQHC = federally qualified health center; HRSA = Health Resources and Services Administration; N = number; NA = not applicable; NIH = National Institutes of Health; NR = not reported; PCP = primary care provider; SBIRT = screening, brief intervention, and referral to treatment; SD, standard deviation.

Table B-4. Detailed study and population characteristics for included studies on general behavioral health

Author, Year Trial Name Study Design Trial Registry Number Funder/ Sponsor Risk of Bias	Clinical Intervention, Goal of Implementation Strategy	Intervention and Comparator(s) (N)	Population of Focus	Patient Age and Sex	Setting/Clinic Type	Implementation Period	Other Population Characteristics
Thompson, 2016[16] Nonrandomized controlled trial Registry number NR National Institutes of Health (NIH) Risk of bias: High	**Behavioral/social/emotional screening, tobacco, alcohol, or drug use assessment, depression and suicide risk screening** Implement an Adolescent Health Risk Assessment that includes screening for risky behavior and emotions/mood (e.g., depression); adapted from the GAPS	Intervention: **Technology (computerized assessment)** (20 practices, providers NR, 99 patients) Comparator: **No implementation strategy** (2 practices, providers NR, 64 patients)	Adolescents ages 14 to 18 years attending primary care visits at pediatric and family medicine practices in Gainesville, Jacksonville, Orlando, and Tallahassee, Florida	N (%)[a] 14 years: 34 (20.9%) 15 years: 34 (20.9%) 16 years: 34 (20.9%) 17 years: 31 (19.0%) 18 years: 30 (18.4%) N (%) Female: 96 (58.9%)	Varied by clinic, but included at least the following: pediatric and family medicine physicians, residents, nurse practitioners, and nurses at academic, non-academic , and FQHC pediatric and family medicine practices (N=22) in geographically diverse areas of Florida	6 months	N[a] (%) Race/Ethnicity Non-Hispanic White: 79 (48.5%) Non-Hispanic Black: 62 (38.0%) Hispanic: 22[a] (13.5%) Self-reported risk behaviors Sad or hopeless almost every day for 2 weeks 27 (16.7%) Clinic weighted % only (n NR) <10% patients at clinic enrolled in Medicaid or CHIP Intervention: 14.1% Comparator: 82.8% 10%-24% patients at clinic enrolled in Medicaid or CHIP Intervention: 22.2% Comparator: 0.0% 25%-50% patients at clinic enrolled in Medicaid or CHIP Intervention: 3.0% Comparator: 0.0% >50% patients at clinic enrolled in Medicaid or CHIP Intervention: 60.6% Comparator: 17.2%

Author, Year Trial Name Study Design Trial Registry Number Funder/ Sponsor Risk of Bias	Clinical Intervention, Goal of Implementation Strategy	Intervention and Comparator(s) (N)	Population of Focus	Patient Age and Sex	Setting/Clinic Type	Implementation Period	Other Population Characteristics
Richardson, 2019[17] Check Yourself Study Randomized controlled trial NCT02360410 AHRQ and HRSA Risk of bias: Some concerns	**Behavioral/social/emotional screening, tobacco, alcohol, or drug use assessment, depression and suicide risk screening** Implement electronic screening with integrated personalized patient feedback and provide clinicians with a summary of screening results, including a categorization of the patient's health risks as low, moderate, or high within 6 areas (nutrition, activity, substance use, emotions, sexual activity, and safety)	Intervention: **Support clinicians (relay data)** (practices and providers NR, 147 patients allocated [141 analyzed]) Comparator: **Educational materials** (practices and providers NR, 153 patients allocated [151 analyzed])	Adolescents ages 13 to 18 years	Mean (SD) age Intervention: 14.5 years (1.4) ; Comparator: 14.5 years (1.4) N (%) Female 155 (51.7%)	Physicians and advanced practitioners at 5 pediatric clinics in Washington State	16 months	Race/Ethnicity N (%) White: 201 (67%) Asian: 40 (13.3%) Hispanic: 9 (3.0%) African American Intervention: 0 (0%) Control: 3 (2.0%) Native American Intervention: 1 (0.7%) Comparator: 0 (0%) Other or multiracial: 46 (15.3%) Baseline risk score, mean (SD) Intervention: 3.71 (2.79) Comparator: 3.39 (2.27)

Author, Year Trial Name Study Design Trial Registry Number Funder/ Sponsor Risk of Bias	Clinical Intervention, Goal of Implementation Strategy	Intervention and Comparator(s) (N)	Population of Focus	Patient Age and Sex	Setting/Clinic Type	Implementation Period	Other Population Characteristics
Richardson 2021[18] Check Yourself v2.0 Nonrandomized controlled trial NCT02882919 AHRQ and HRSA Risk of bias: Some concerns	**Behavioral/social/emotional screening, Tobacco, alcohol, or drug use assessment, Depression and suicide risk screening** Implement an adapted version of the Check Yourself tool (version 2), an electronic screening tool that assesses protective factors and risk behaviors using a HEADSS pneumonic framework and screen for specific nutritional behaviors (like drinking sugar-sweetened beverages), physical activity, and sleep.	Intervention: **Support clinicians (relay data)** (practices and providers NR, 145 patients) Comparator: **Educational materials** (practices and providers NR, 155 patients)	Adolescents aged 13 to 18 years	N (%) 13-15 years: 228 (76%) 16-18 years: 72 (24%) N (%) Female 129 (43%)	Physicians and advanced practitioners at 5 pediatric clinics in Washington State	15 months	N (%) race/ethnicity White 192 (64.0%) Hispanic 19 (6.3%) African American 19 (6.3%) Asian or Pacific Islander 14 (4.7%) Native American 1 (0.3%) Other or multiracial 55 (18.3%) Mean (SD) baseline risk behavior score Intervention: 2.86 (2.33) Comparator: 3.10 (2.52)

Author, Year Trial Name Study Design Trial Registry Number Funder/ Sponsor Risk of Bias	Clinical Intervention, Goal of Implementation Strategy	Intervention and Comparator(s) (N)	Population of Focus	Patient Age and Sex	Setting/Clinic Type	Implementation Period	Other Population Characteristics
Walter, 2021[19] Nonrandomized controlled trial (stepped-wedge) Not registered Boston Children's Hospital Payer Provider Quality Initiative Risk of bias: High	**Behavioral/social/ emotional screening** Implement a BH stepped-care model consisting of 4 steps: (1) primary care screening and guided self-management with followup; (2) primary care focused assessment; (3) primary care treatment with basic psychopharmacology and/or focused psychotherapy; (4) specialty care if symptoms persist for mild to moderate mental health disorders identified	Intervention: **Behavioral health incorporation (with learning collaborative**) (59 practices, 354 providers allocated [125 analyzed], 464 to 28,369 patients per practice) **No Comparator**	Practice members of a statewide association of community-based, independently owned pediatric practices affiliated with an academic medical center	Not reported	Primary care providers (70% physicians, 29% NPs, 1% physician assistants) at community-based, independently owned pediatric practices in Massachusetts	60 months	Race/ethnicity across all practices' patients (%) White: 71% Black: 9% Hispanic: 12% Asian American: 7% Health insurance status Commercially insured: 75% Medicaid: 25% Patients with public insurance at participating practices across implementation phases, mean % Phase 1 (start date: July 2013): 20.2% Phase 2 (start date: September 2014): 13.2% Phase 3 (start date: June 2015): 24.4% Phase 4 (start date: June 2016): 23.4% Phase 5 (start date: June 2017): 27.7%

[a] Value calculated by authors.

AHRQ = Agency for Healthcare Research and Quality; BH = behavioral health; CHIP = children's health insurance program; FQHC = federally qualified health center; GAPS = Guidelines for Adolescent Preventive Services; HEADSS, Home, Education, Activities, Drugs, Depression, Sexuality, and Safety; HRA = health risk assessment; HRSA = Health Resources and Services Administration; IT = information technology; NP = nurse practitioner; NR = not rated; SD, standard deviation.

Detailed Implementation Strategies

In this section, we describe the implementation strategies used in the included studies. For each study, we coded the implementation strategies according to the Expert Recommendations for Implementing Change (ERIC) and the Effective Practice and Organisation of Care (EPOC) crosswalk described in Table A-7 and described how each strategy was operationalized according to the Proctor guidelines for reporting in implementation research.[20] We summarize the implementation strategies used in each study arm and report how the strategies were operationalized in **Table B-5**, **Table B-6**, **Table B-7**, and **Table B-8**.

Implementation Strategies Used in Studies on Screening for Depression and Suicide Risk

The **clinician support-based implementation approach** to implementing screening for depression and suicide risk assessed by Dalal et al. incorporated a templated note in the electronic health record that provided prompts for the recommended steps in depression screening and documentation (*reminders*[a]*)*; leveraged train and educate strategies, which involved clinicians attending a one-time webinar co-led by a pediatrician and child psychiatrist focused on best practices for completing a clinical interview and diagnosing depression (*conduct educational meetings*); and developed relationships strategies, which involved clinicians organizing internal meetings and participating in a series of conference calls to review cases and data and discuss questions and concerns before and after each intervention period (*organize clinician team meetings*). Clinicians were actively involved in the planning, implementation, evaluation, and data review related to this project and received American Board of Pediatrics Maintenance of Certification credit following active participation attestation (*organize clinician team meetings*). Practices in the control group received no implementation support.[6]

Among the two studies that evaluated **learning collaboratives** as an overarching implementation approach[8 7] both evaluated and iterated on implementation. The nonrandomized study [7] implemented learning collaboratives to improve screening rates and the interrupted time series study implemented learning collaboratives to improve screening, brief intervention, and referral to treatment (SBIRT).[8] The nonrandomized controlled study had participating practices complete a Mental Health Practice Readiness Inventory (*assess readiness)* and discuss improvements to help their practice. Subsequently, teams met monthly to discuss and plan workflow modifications for depression screening, implementing Plan-Do-Study-Act (PDSA) cycles [7] (*conduct cyclical tests of change*). In the interrupted time series study, practices completed a checklist covering things to have in place prior to the practice initiating universal screening and management plan components (*develop an implementation blueprint)*. Over 6 months, practices leveraged on evaluate and iterate strategies: first, tailoring electronic health record (EHR) systems to better identify patients eligible for depression screening, and later focusing on improving workflow efficiencies to ensure providers reviewed completed forms, documented screening in the EHR, and provided recommended education (*conduct cyclical tests of change*).

Both studies also leveraged interactive assistance strategies. In the nonrandomized controlled study, interactive assistance was provided through from a coach who delivered tailored guidance on PDSA cycles, engaged practice staff, and provided workflow improvement techniques

[a] Text in parentheses indicates how an implementation strategy was coded using the adapted ERIC-EPOC framework (Table A-7).

(*facilitation)*.[7] In the interrupted time series study[8], all four practices in rural Ohio received interactive assistance from practice facilitation leads who trained medical and office staff at each pediatric practice in the Institute for Healthcare Improvement Model for Improvement (*facilitation*). These facilitators helped develop practice-specific goals and interventions using baseline and assisted with data collection, including monthly chart audits. Finally, each study also included training and education for clinicians to improve screening rates. In the nonrandomized controlled study,[7] network practices were invited to *engage in learning collaborative*. Members were required to attend a day-long learning session and at least three of six project calls over 7 months. Clinicians could earn credits for Maintenance of Certification Continuing Medical Education. In the interrupted time series study,[8] all practices trained and educated involved staff. A developmental-behavioral pediatrician delivered an interactive learning session open to all practitioners and office staff among participating practices designed with the goal of improving their knowledge and skills to identify and manage depression in primary care (*make training dynamic*).

There were some differences in the specific strategies included among the studies that implemented learning collaboratives as their overall approach to increase screening rates for depression. In the nonrandomized controlled study,[7] practices formed multidisciplinary teams (i.e., physicians, nurses, and administrative staff) responsible for setting practice goals, implementing changes, and measuring improvements monthly *(developed workgroups)*. Additionally, practices chose the depression screening tool that worked best for their practice (*select based on practice and setting*).

Comparison practices in the nonrandomized controlled study compared did not implement an implementation strategy,[7] and the interrupted time series study conducted a centerline shift analysis to evaluate the impact of the learning collaborative implementation approach.[8]

Table B-5 summarizes the detailed implementation strategies used in both the intervention and comparator arms of studies on screening for depression and suicide risk and details on how the strategies were operationalized in practice.

Implementation Strategies Used in Studies on Eating Disorders

Twenty-three practitioners who were already engaged in a learning community on adolescent medicine were selected to participate in the active-learning group (*engage in learning collaborative*). In addition to the learning community, this group received interactive training through (1) a 1-hour in-person lecture focusing on the screening and treatment of eating disorders, led by a board-certified adolescent medicine specialist, and (2) a mobile application (*make training dynamic*). The application provided access to Academy of Eating Disorders guide materials and periodically disseminated questions derived from the materials to the participants to test their knowledge. Furthermore, those in the active-learning group were required to undertake a quality improvement project in their respective practices that was centered on enhancing the screening process for eating disorders (*conduct cyclical tests of change*). A total of 280 practitioners who were not involved in the learning community were invited to the print-learning group, which served as the comparison arm. They received printed copies of the Academy of Eating Disorders guide and were encouraged to read and apply its concepts (*distribute educational materials*), without any further implementation support.

Table B-6 summarizes the detailed implementation strategies used in both the intervention and comparator arms of studies on eating disorders and details on how the strategies were operationalized in practice.

Implementation Strategies Used in Studies on Substance Use Disorders

The trial evaluating a **clinician support-based approach** to implement computer-facilitated screening and brief intervention (cSBI) included guidance for providers to access before delivering the brief interventions to patients (*provider reminders*).[10] After patients had completed their screening, providers were able to access the screening results along with recommended talking points via tablet to aid administration of the brief intervention when patients screened positively (*provider reminders*).[10] The addition of provider reminders was compared to implementation as usual. Providers in both arms received training related to cSBI (*dynamic training)*.[10] The training consisted of three 1-hour-long training sessions to orient providers to the cSBI, provide video examples of brief counseling, and complete in-person training to practice motivational interviewing skills (*make training dynamic*) for which providers received continuing medical education (CME) credits.[10] Patients in both groups completed the substance use screening via a tablet computer program and were then able to view their scores and additional educational material (*use technology*). Providers in the cSBI arm were able to access patients' screening results and suggested talking points via the tablet as well.

Both studies assessing **incorporation-based approaches** to implementation embedded a behavioral healthcare provider into the primary care team (*create new clinical teams*). The use of audit and feedback and centralized technical assistance was similar across the studies. In the study comparing specialist and generalist sites, EHR data was aggregated at the clinic-level and used to provide a holistic view of SBIRT adherence during quarterly trainings.[12] Ongoing technical assistance was available across both studies and was delivered by implementation specialists for providers, managers, and other clinic staff (*centralize technical assistance*).[12, 15] Providers in the generalist and specialist sites were able to view their adherence to implementation using a combination of written feedback and EHR data (*conduct audit and feedback*).[12] In the three-arm cluster RCT, feedback regarding SBIRT and referral rates was provided during quarterly meetings to pediatricians delivering SBIRT, as well as to behavioral healthcare practitioners, to reinforce fidelity to the model being implemented (*conduct audit and feedback*).[15]

The studies differed in the use of additional implementation strategies. Providers received reminders to deliver the screening, brief intervention, referral to treatment via email, staff meetings, and the EHR (*provider reminders*) in one study,[15] while the other used an organizational champion with the clinics (*identify and prepare a champion*) and modified the EHR to display screening results directly to providers (*facilitate relay of clinical data*).[12] To improve the uptake of SBIRT across Federally Qualified Health Centers, providers and behavioral health counselors also received hour-long training sessions and were offered quarterly educational booster sessions (*conduct ongoing training*).[12] In the three-arm cluster RCT, pediatricians in both intervention arms attended educational meetings, though the number of sessions differed across arms (*conduct educational meetings*).[15] Pediatricians who were working alongside behavioral healthcare practitioners received a single session, while pediatricians responsible for delivering SBIRT independently received three training sessions.[15] Both intervention arms also received educational materials and resources related to motivational interviewing and the delivery of SBIRT (*distribute educational materials*).[15] The study arms that received either support only or training plus behavioral healthcare incorporation also had access to clinical consultations throughout the study (*provide ongoing consultation*).[15]

In both studies assessing **incorporation-based approaches**, providers in the comparator arms received varying levels of support without behavioral health incorporation. In the study

comparing generalist and specialist sites, primary care providers in the generalist sites (comparator arm) received training and support to administer brief intervention.[12] In the three-arm study, the comparator arm included usual implementation, wherein providers received no training or access to a behavioral healthcare practitioner).[15]

Table B-7 summarizes the detailed implementation strategies used in both the intervention and comparator arms of studies on substance use disorders and details on how the strategies were operationalized in practice.

Implementation Strategies Used in Studies on General Behavioral Health

The **technology-based implementation approach** assessed by Thompson et al. primarily leveraged change infrastructure strategies, which involved providing practices with (1) a technology enhanced health risk assessment, (2) tablets that adolescents could use to complete the electronic assessment, and (3) access to an online platform that would aggregate adolescent responses into a report that clinicians could use to guide discussion of health risks with the adolescent (*change physical equipment and use technology*).[16] Providers further received support from study coordinators that included training on the study protocol (*conduct educational meetings*), weekly monitoring of clinician fidelity to screening (*monitor delivery performance*), site visits to resolve practice-specific implementation concerns (*provide facilitation*), and assess clinic-specific adaptations to the implementation protocol to ensure they were sufficiently similar to the study protocol to be acceptable (*tailor based on practice and setting*). Providers in the comparison group did not have access to the technology enhanced assessment with clinician guidance but were allowed to continue using any health risk assessments that were already in use at their practice and received no implementation support.

Two randomized controlled trials (RCTs) compared electronic screening for health risk behaviors paired with personalized feedback delivered to the patient and a clinician summary delivered to the provider to electronic screening alone among adolescents ages 13 to 18 years to assess a **clinician support-based approach** to implementing screening and brief intervention (SBI).[17, 18] Adolescents presenting for a well visit were randomized to a well visit where both they and their provider received feedback or not. All participating providers were invited to complete a 15-minute training about the screening tool and clinical summary (*distribute educational materials*) and all adolescents completed an EHR assessment. In both cases, the practice's usual procedures for performing health risk assessment and counseling were also performed. Only adolescents randomized to receive care with feedback received immediate, interactive feedback on their behaviors to review prior to meeting with their provider (*prepare patients to be active participants*). For these adolescents, a clinical summary was also automatically generated and printed for providers to support delivery of brief intervention for patients who reported moderate- or high-risk behaviors (*facilitate relay of clinical data to providers*). For adolescents randomized to receive care without feedback, providers were encouraged to follow their practice's usual procedures for performing health risk assessment and counseling.

The fourth study used a stepped-wedge design to evaluate an **incorporation-based approach** to implementing SBIRT by embedding behavioral health clinicians within the primary care practices (*create new clinical teams*) to increase behavioral health screening at well visits, psychotherapy visits when appropriate, and psychotropic medication prescribing when indicated.[19] Another key component of this approach was a learning collaborative for practices to share and discuss their implementation experiences and challenges (*engage in learning*

collaborative). Additional components included tailored support through the learning collaborative (*provide ongoing consultation*), securing support from practice leadership and ensuring that both on-site and off-site teams had support from executive leadership of their entities (*change organizational culture*), additional didactic session for the behavioral health clinicians incorporated into the clinics (*conduct educational meetings*), and providing clinical data back to primary care providers tasked with providing brief intervention to patients who screen at risk (*facilitate relay of clinical data to providers*).

Table B-8 summarizes the detailed implementation strategies used in both the intervention and comparator arms of studies on general behavioral health and details on how the strategies were operationalized in practice.

Implementation Strategies Used in Studies Conducted Outside the United States

The Australian RCT by Sanci et al. assessed a multicomponent **clinician training** implementation approach to introduce clinicians and practice support staff (i.e., receptionists and practice managers) at implementation practices to screening for health risk behaviors and help them integrate screening into office and clinical procedures.[21] First, clinicians were invited to attend three 3-hour interactive training workshops covering youth-friendly care, screening for and discussing health risks, and addressing detected screen-detected risky behaviors with a brief intervention based on motivational interviewing principles (*make training dynamic*). At workshops, clinicians received didactic training from an adolescent primary care expert, practiced newly learned skills using role play with adolescent actors, received feedback and coaching in youth-friendly communication skills, and were introduced to the study screening tool prompting them to discuss health risk behaviors, protective factors, and strengths with their patients. After workshop completion, an adolescent primary care expert and a research assistant (RA) conducted two practice visits and helped practices integrate a new screening tool for health risk behaviors into office and clinical procedures using PDSA cycles (*provide facilitation*). RAs also helped practices update their referral lists with local youth specialist services and provided posters and pamphlets addressing youth-friendly care and health risk behaviors (*distribute educational materials*). Clinicians and practice support staff were also provided data from patient exit interviews as feedback to help them identify aspects of care that could be improved (*obtain and use patient and family feedback*). Clinicians in the comparison arm received a single 3-hour seminar on youth-friendly care including recommendations to discuss health risks with young people (*conduct educational meeting*).

The Iranian RCT by Sharifi et al. also assessed a **clinician training** implementation approach via an interactive 2.5-day training on managing common child mental health problems for general practitioners (GPs) already practicing in an existing adult collaborative care program to help them more often identify child mental health problems, engage families, and provide brief interventions.[22] Training used lectures, discussion, and practice with standardized patients and helped GPs provide screen-identified patients with brief interventions such as transdiagnostic problem solving, help with parent-child interactions, and condition-specific brief treatments (*make training dynamic*). Control GPs received a 1-day refresher in problem recognition and description of treatment outcomes available through local community mental health centers (*conduct educational meeting*).

Table B-5. Detailed implementation strategies for included studies on screening for depression

Study Comparison	Implementation Strategy Domain	Strategies Used in the Intervention	Strategies Used in the Comparator	Strategy Operationalization
Dalal 2023[6] **Support clinicians** (intervention) vs. **No strategy** (comparator) to implement screening for depression and suicide risk	Develop relationships with internal and external partners	Organize Clinician Implementation Team Meetings	No implementation strategy	**Organize Clinician Implementation Team Meetings (intervention only)** **Who delivered the implementation strategy:** QI clinicians and unspecified project team members **Steps taken:** Clinicians participated in a series of one-hour conference calls to review cases and data, and discuss questions and concerns, before and after each intervention period. Additionally, each clinician conducted reviews of at least 10 of their charts during the pre- and post-intervention periods and reported outcomes using a survey tool. QI clinicians were actively involved in the planning, implementation, evaluation, and data review related to this project and received ABP MOC credit following active participation attestation. **Who was engaged at each step:** QI clinicians
	Train and educate stakeholders	Conduct educational meeting	No implementation strategy	**Conduct educational meeting (intervention only)** **Who delivered the implementation strategy:** Pediatrician and child psychiatrist **Steps taken:** 18 QI-participating clinicians attended a webinar co-led by a pediatrician and child psychiatrist, which focused on best practices for completing a clinical interview and diagnosing depression. **Who was engaged at each step:** QI clinicians

Study Comparison	Implementation Strategy Domain	Strategies Used in the Intervention	Strategies Used in the Comparator	Strategy Operationalization
	Support clinicians	Reminders	No implementation strategy	**<u>Reminders (intervention only)</u>** **Who delivered the implementation strategy:** Unspecified RMG staff **Steps taken:** Smart Phrase (templated note in the EHR) provided pediatricians with prompts outlining the recommended steps in depression assessment. If a patient scored at risk, providers could easily use the Smart Phrase to help guide further assessment. **Who was engaged at each step:** QI clinicians

Study Comparison	Implementation Strategy Domain	Strategies Used in the Intervention	Strategies Used in the Comparator	Strategy Operationalization
Harder 2019[7] **Learning Collaborative** (intervention) vs. **No Strategy** (comparator) to implement screening for depression and suicide risk	Evaluate and iterate implementation	Assess for readiness Conduct cyclical tests of change	N/A	**<u>Assess for Readiness (intervention only):</u>** **Who delivered the implementation strategy:** Each practice's multidisciplinary team **Steps taken:** Each practice team completed the MHPRI at the beginning of the learning collaborative and used the results to discuss improvements that would help their practice; each practice team recompleted the MHPRI at the end of the learning collaborative. **Who was engaged at each step:** N/A **<u>Conduct Cyclical Tests of Change (intervention only):</u>** **Who delivered the implementation strategy:** Each practice's multidisciplinary team and VCHIP staff **Steps taken:** Practice-specific data were reviewed with practice teams to demonstrate gaps between adolescent depression screening with validated tool percentages and national recommendations to screen 100% of adolescents. Ideas for implementing office systems changes across 5 domains outlined in the MHPRI. Each practice team met at least monthly to make plans for modifying workflows to incorporate depression screening and complete monthly PDSA cycles to test their changes systematically. Teams submitted PDSA worksheets to VCHIP each month along with medical record review data. VCHIP provided visualizations of their data. **Who was engaged at each step:** N/A

Study Comparison	Implementation Strategy Domain	Strategies Used in the Intervention	Strategies Used in the Comparator	Strategy Operationalization
Harder 2019[7] **Learning Collaborative** (intervention) **vs. No Strategy** (comparator) to implement screening for depression and suicide risk (continued)	Provide interactive assistance	Facilitation	N/A	**Facilitation (intervention only)** **Who delivered the implementation strategy:** VCHIP staff **Steps taken:** VCHIP provided team-specific coaching for improvement, such as next steps in PDSA cycles, engaging practice staff, and techniques to improve office workflow. **Who was engaged at each step:** Each practice's multidisciplinary team
	Select, adapt, and tailor to context	Practice and setting	N/A	**Practice and Setting (intervention only)** **Who delivered the implementation strategy:** Each practice's multidisciplinary team **Steps taken:** Practices chose the depression screening tool that worked best for their practice from those listed in the AAP Mental Health Toolkit. **Who was engaged at each step:** N/A
	Develop relationships with internal and external partners	Use Workgroups	N/A	**Use Workgroups (intervention only)** **Who delivered the implementation strategy:** N/A **Steps taken:** Participating practices formed multidisciplinary (physicians, nurses, and administrative staff) teams responsible for setting practice goals, implementing changes, and measuring improvements on a monthly basis. **Who was engaged at each step:** Physicians, nurses, and administrative staff

Study Comparison	Implementation Strategy Domain	Strategies Used in the Intervention	Strategies Used in the Comparator	Strategy Operationalization
	Train and educate stakeholders	Learning collaborative	N/A	**Learning Collaborative (intervention only)** **Who delivered the implementation strategy:** VCHIP staff **Steps taken:** All CHAMP network practices were invited to join the QI collaborative. The collaborative fostered shared learning and collaboration within and between practices. Team members were required to attend a day-long learning session and at least 3 of 6 project calls over 7 months. VCHIP identified successes and challenges among practice teams and addressed these during 6 all-practice calls. As an incentive, physicians were offered 25 credits toward Part IV MOC and up to 20 hours of CME. **Who was engaged at each step:** Each practice's multidisciplinary team

Study Comparison	Implementation Strategy Domain	Strategies Used in the Intervention	Strategies Used in the Comparator	Strategy Operationalization
Baum 2020[8] **Learning collaborative** (intervention) vs. **No comparator** to implement an SBIRT management bundle for depression	Evaluate and iterate implementation	Implementation blueprint Conduct cyclical tests of change	N/A	**<u>Implementation blueprint (intervention only)</u>** **Who delivered the implementation strategy:** Project leadership **Steps taken:** We provided practices with a project checklist. During months 0-3, practices completed the project checklist to ensure that they were implementing necessary elements of the project. **Who was engaged at each step:** Participating practices **<u>Conduct cyclical tests of change (intervention only)</u>** **Who delivered the implementation strategy:** PF lead, participating practices **Steps taken:** To begin the project, participating practices reviewed baseline data gathered by the PF lead and developed their aim statements. During months 0-3, practices instituted processes within their EHR to identify eligible patients to be screened. In months 4-6, the teams worked on improving workflow issues. Control charts (p-charts) of both the process measure (depression screening) and the outcome measure (depression management bundle) were presented monthly to the practice team as a way to show progress, address process issues, and celebrate improvements. CME and MOC Part 4 points to pediatricians who completed the project. **Who was engaged at each step:** Participating practices

Study Comparison	Implementation Strategy Domain	Strategies Used in the Intervention	Strategies Used in the Comparator	Strategy Operationalization
	Provide interactive assistance	Facilitation	N/A	**Facilitation (intervention only)** **Who delivered the implementation strategy:** Practice facilitators or coaches, QI specialists **Steps taken:** Coaches help practice teams of medical and office staff develop practice-specific aims, drivers, and interventions using baseline data. The facilitators manage QI projects by assisting in data collection and measurement. QI specialists provide practices with a menu of potential projects, support project development, and implementation and offer evidence-based resources to encourage project completion. **Who was engaged at each step:** Participating practice teams
	Train and educate stakeholders	Make training dynamic	N/A	**Make training dynamic** **Who delivered the implementation strategy:** Project leads, including project medical lead (DBP) **Steps taken:** Project leads developed an interactive learning session for participating practices. This session was open to all practitioners and office staff and was conducted by the project's medical lead, a DBP. During months 0-3, practices received training on managing depression in primary care. **Who was engaged at each step:** Practitioners and office staff at participating clinics

ABP = American Board of Pediatrics; AAP = American Academy of Pediatrics; CHAMP = Child Health Advances Measured In Practice; CME = continuing medical education; DBP = developmental-behavioral pediatrician; EHR = electronic health record; MHPRI = Mental Health Practice Readiness Inventory; MOC = maintenance of certification; N/A = not applicable; PDSA = Plan-Do-Study-Act; PF = practice facilitation; QI = quality improvement; RMG = Reliant Medical Group; VCHIP, Vermont Child Health Improvement Program; vs. = versus.

Table B-6. Detailed implementation strategies for included studies on eating disorders

Study Comparison	Implementation Strategy Domain	Strategies Used in the Intervention	Strategies Used in the Comparator	Strategy Operationalization
Gooding, 2017[9] **Learning collaborative** (intervention) vs. **Educational materials** (comparator) to implement screening for eating disorders	Evaluate and iterate implementation	Conduct cyclical tests of change	N/A	**Conduct cyclical tests of change (intervention only)** **Who delivered the implementation strategy:** Adolescent medicine LC practitioners **Steps taken:** Active-learning participants completed a quality improvement project within their practice. **Who was engaged at each step:** N/A
	Train and educate providers	Make training dynamic Engage in learning collaborative	Distribute educational materials	**Make training dynamic (intervention only)** **Who delivered the implementation strategy:** Board-certified adolescent medicine specialist **Steps taken:** Practitioners in the active-learning group participated in a 1-hour in-person interactive lecture on screening and treatment for eating disorders. Active-learning group practitioners were invited to review material from the AED guide via a mobile application. 12 eating disorder questions derived from the AED guide were delivered to participants over 5 weeks. Questions were resent 8 days later if incorrect and 16 days later if answered correctly. **Who was engaged at each step:** PPOC adolescent medicine LC practitioners. **Engage in learning collaborative (intervention only)** **Who delivered the implementation strategy:** Staff at Boston Children's Hospital **Steps taken:** In 2015, PPOC offered an adolescent medicine LC focused on confidentiality and legal issues, transition to adult care, anxiety, depression, obesity, and eating disorder screening and treatment. The 23 practitioners in the adolescent medicine LC received equal instruction in each of the adolescent medicine LC topics over the course of the year. **Who was engaged at each step:** PPOC adolescent medicine LC practitioners **Distribute educational materials (comparator only)** **Who delivered the implementation strategy:** NR **Steps taken:** Each practice in the print-learning group received print copies of the AED guide to disseminate to all practitioners in their practice. Practitioners in this group were encouraged to read and implement concepts from the AED guide, but no further intervention was provided. **Who was engaged at each step:** PPOC practices and practitioners

AED = Academy for Eating Disorders; LC = Learning Collaborative; N/A, not applicable; PPOC = Pediatric Physicians' Organizations at Childrens; vs. = versus.

Table B-7. Detailed implementation strategies for included studies on substance use disorders

Study Comparison	Implementation Strategy Domain	Strategies Used in the Intervention	Strategies Used in the Comparator	Strategy Operationalization
Knight 2019[10] Gibson, 2021[11] **Clinician support** (intervention) vs. **Technology only** (comparator) to implement SBI for alcohol, marijuana, and other drug use	Train and educate stakeholders	Make training dynamic	Make training dynamic	**Make training dynamic Who delivered the implementation strategy:** Not reported **Steps taken:** 1-hour orientation session that comprised a demonstration of the tablet computer program, a review of practitioner reports for various categories of risk, the study safety protocol, a 20-minute video showing examples of brief counseling based on suggested talking points, a 1-hour online training session with video examples of practitioner counseling, and a 1-hour motivational interviewing skills development training session. **Who was engaged at each step:** Practitioners
	Support clinicians	Reminders	N/A	**Reminders (intervention only)** **Who delivered the implementation strategy:** The cSBI office system **Steps taken:** Point of care decision support including screening results, risk level, talking points, and recommended followup plan provided to practitioner. Practitioners gave a printed Contract for Life to all patients and parents or guardians, if present, as a prevention strategy for high- and low-risk patients. **Who was engaged at each step:** Practitioners
	Change infrastructure	Use information and communication technology	Use information and communication technology	**Use information and communication technology (intervention)** **Who delivered the implementation strategy:** The cSBI office system **Steps taken:** Patients complete risk screening using a tablet-based, cSBI system prior to PCP encounter; patients immediately receive CRAFFT score and level of risk; cSBI provides personalized risk feedback and psycho-educational content based on screen results; electronic delivery of prompts for practitioner talking points. **Who was engaged at each step:** Practitioners and patients **Use information and communication technology (comparator)** **Who delivered the implementation strategy:** The cSBI office system **Steps taken:** Patients complete risk screening using a tablet-based. **Who was engaged at each step:** Practitioners and patients

Study Comparison	Implementation Strategy Domain	Strategies Used in the Intervention	Strategies Used in the Comparator	Strategy Operationalization
Mitchell 2020[12] Barbosa, 2022[13] Gryczynski, 2023[14] **Behavioral health incorporation** (intervention) vs. **Clinician support only** (comparator) to implement SBIRT for alcohol and other drug use	Evaluate and iterate implementation	Audit and feedback	Audit and feedback	**Audit and feedback (intervention and comparator)** **Who delivered the implementation strategy:** Unclear **Steps taken:** Data on SBIRT services were extracted from the EHR on a bimonthly basis; written feedback was given to PCPs, focusing specifically on their adherence to the implementation model over the past 60 days. EHR data was analyzed at the clinic level and used to provide targeted feedback at quarterly booster trainings. **Who was engaged at each step:** PCPs (for individual-level feedback), clinic (for clinic-level feedback)
	Provide interactive assistance	Centralize technical assistance	Centralize technical assistance	**Centralize technical assistance (intervention and comparator)** **Who delivered the implementation strategy:** Implementation specialists **Steps taken:** Technical assistance was delivered by the implementation specialists for staff at each clinic; sites received technical assistance/ support and feedback for practice managers and providers. **Who was engaged at each step:** Clinic staff, practice managers, providers
	Develop relationships with internal and external partners	Identify and prepare champions	Identify and prepare champions	**Identify and prepare champions (intervention and comparator)** **Who delivered the implementation strategy:** Unclear **Steps taken:** Medical Director served as the project's Organizational Champion **Who was engaged at each step:** Medical Director

Study Comparison	Implementation Strategy Domain	Strategies Used in the Intervention	Strategies Used in the Comparator	Strategy Operationalization
Mitchell 2020[12] Barbosa, 2022[13] Gryczynski, 2023[14] **Behavioral health incorporation** (intervention) vs. **Clinician support only** (comparator) to implement SBIRT for alcohol and other drug use (continued)	Train and educate stakeholders	Train and educate Conduct ongoing training	Train and educate Conduct ongoing training	**<u>Train and educate stakeholders (intervention)</u>** **Who delivered the implementation strategy:** Unclear **Steps taken:** PCPs were trained to provide brief advice, during which the patient was encouraged to accept a warm handoff to meet with a behavioral health counselor, and the proper documentation of activities in the EHR. PCPs and BHCs received 1-hour training on delivering brief interventions using principles of motivational interviewing. **Who was engaged at each step:** PCPs and BHCs **<u>Train and educate stakeholders (comparator)</u>** **Who delivered the implementation strategy:** Unclear **Steps taken:** PCPs were trained to conduct BIs of about 5- to 10-minute duration using motivational interviewing techniques focused on reducing or discontinuing their substance use. All primary care staff received a 1-hour training, orienting them to the project, the screening process, the appropriate responses to screenings. **Who was engaged at each step:** PCPs **<u>Conduct ongoing training (intervention)</u>** **Who delivered the implementation strategy:** Unclear **Steps taken:** Quarterly booster training **Who was engaged at each step:** All pediatric staff and BHCs **<u>Conduct ongoing training (comparator)</u>** **Who delivered the implementation strategy:** Unclear **Steps taken:** Quarterly booster training **Who was engaged at each step:** All pediatric staff
	Support clinicians	Change record system to facilitate relay of clinical data to providers Create new clinical team	Change record system to facilitate relay of clinical data to providers	**<u>Change record system to facilitate relay of clinical data to providers (intervention and comparator)</u>** **Who delivered the implementation strategy:** Unclear **Steps taken:** The EHR was modified to include screening results as well as a provider checklist indicating what services were provided in response to the screening results. **Who was engaged at each step:** PCPs **<u>Create new clinical team (intervention only)</u>** **Who delivered the implementation strategy:** Unclear **Steps taken:** Co-located behavioral health specialist that is incorporated into the clinical team via "the warm handoff" **Who was engaged at each step:** PCPs and BHCs

Study Comparison	Implementation Strategy Domain	Strategies Used in the Intervention	Strategies Used in the Comparator	Strategy Operationalization
Sterling 2015[15] **Behavioral health incorporation with clinician support** (intervention) vs. **Clinician support only** (comparator) vs. **No strategy** (usual implementation) to implement implement SBIRT for substance use	Evaluate and iterate implementation	Audit and provide feedback	Pediatrician Only Audit and provide feedback Usual Care No strategy	**Audit and provide feedback (intervention)** **Who delivered the implementation strategy:** unclear **Steps taken:** Feedback on rates of referral to the BHCP was provided at quarterly meetings, along with a review of the SBIRT protocol and skills, to reinforce fidelity and performance. **Who was engaged at each step:** Pediatrician **Audit and provide feedback (pediatrician only)** **Who delivered the implementation strategy:** unclear **Steps taken:** Feedback on SBIRT rates was provided at quarterly meetings, along with a review of the SBIRT protocol and skills, to reinforce fidelity and performance. **Who was engaged at each step:** Pediatrician
	Provide interactive assistance	Centralize technical assistance	Pediatrician Only Centralize technical assistance Usual Care No strategy	**Centralize technical assistance (intervention and pediatrician only)** **Who delivered the implementation strategy:** Unclear **Steps taken:** Made technical assistance and clinical consultation available as needed **Who was engaged at each step:** Pediatrician
	Train and educate stakeholders	Conduct educational meetings Distribute educational materials	Pediatrician Only Conduct educational meetings Distribute educational materials Usual Care No strategy	**Conduct educational meeting (intervention)** **Who delivered the implementation strategy:** Unclear **Steps taken:** One 60-minute session addressing motivational interviewing principles, patterns of hazardous substance use and common mental health symptoms, the manualized brief intervention protocol, educational resources, and protocols for specialty substance use and mental health treatment referral. **Who was engaged at each step:** Pediatrician and BHCP **Conduct educational meeting (pediatrician only)** **Who delivered the implementation strategy:** Unclear **Steps taken:** Three 60-minute sessions addressing motivational interviewing principles, patterns of hazardous substance use and common mental health symptoms, the manualized brief intervention protocol, educational resources, and protocols for specialty substance use and mental health treatment referral. **Who was engaged at each step:** Pediatrician **Distribute educational materials (intervention and pediatrician only)** **Who delivered the implementation strategy:** Unclear **Steps taken:** Provide training materials to pediatricians to view at their convenience **Who was engaged at each step:** Pediatrician

Study Comparison	Implementation Strategy Domain	Strategies Used in the Intervention	Strategies Used in the Comparator	Strategy Operationalization
Sterling 2015[15] **Behavioral health incorporation with clinician support** (intervention) vs. **Clinician support only** (comparator) vs. **No strategy** (usual implementation) to implement implement SBIRT for substance use (continued)	Support clinicians	Create new clinical team Reminders	Pediatrician Only Reminders Usual Care No strategy	**Create new clinical team (intervention only)** **Who delivered the implementation strategy:** unclear **Steps taken:** BHCP was added to the clinical team—pediatricians working in coordination with embedded BHCPs. **Who was engaged at each step:** Pediatricians and BHCP **Reminders (intervention and pediatrician only)** **Who delivered the implementation strategy:** Unclear **Steps taken:** Emails and staff meetings to address screening and assessment tools in the EHR and reminders on requirement to document clinical activities. **Who was engaged at each step:** Pediatrician

BHC = behavioral health clinician; BHCP = behavioral health care provider; BI = brief intervention; CRAFFT = car, relax, alone, forget, family or friends, trouble; cSBI = computer-delivered screening and practitioner-delivered brief intervention; EHR = electronic health record; PCP = primary care provider; SBIRT = screening, brief intervention, and referral to treatment; vs. = versus.

Table B-8. Detailed implementation strategies for included studies on general behavioral health

Study Comparison	Implementation Strategy Domain	Strategies Used in the Intervention	Strategies Used in the Comparator	Strategy Operationalization
Thompson 2016[16] **Technology (computerized assessment)** (intervention) vs. **No strategy** (comparator) to implement screening for general health risks	Evaluate and iterate implementation	Monitoring the performance of the delivery	No implementation strategy	**Monitoring the performance of the delivery (intervention only)** **Who delivered the implementation strategy:** Study coordinators working as practice facilitators **Steps taken:** Fidelity monitoring was systematically reviewed weekly and issues were resolved in a variety of ways. **Who was engaged at each step:** Clinic staff
	Provide interactive assistance	Facilitation	No implementation strategy	**Facilitation (intervention only)** **Who delivered the implementation strategy:** Study coordinators working as practice facilitators **Steps taken:** Frequent visits were made to each clinic to ensure fidelity and to address any implementation issues. **Who was engaged at each step:** Clinic staff

Study Comparison	Implementation Strategy Domain	Strategies Used in the Intervention	Strategies Used in the Comparator	Strategy Operationalization
Thompson 2016[16] **Technology (computerized assessment)** (intervention) **vs. No strategy** (comparator) to implement screening for general health risks (continued)	Select, adapt, and tailor to context	Practice and setting	No implementation strategy	**Practice and setting (intervention only)** **Who delivered the implementation strategy:** Study coordinators working as practice facilitators **Steps taken:** Given practice differences, study coordinators had to work through site-specific adaptations, figuring out which were acceptable and which were too significantly different from the study protocol to be allowed. **Who was engaged at each step:** Clinic staff
	Train and educate stakeholders	Train and educate stakeholders[a]	No implementation strategy	**Train and educate stakeholders (intervention only)** **Who delivered the implementation strategy:** Study coordinators working as practice facilitators **Steps taken:** Study coordinators worked as practice facilitators, training clinic staff on the protocol. **Who was engaged at each step:** Clinic staff
	Change infrastructure	The use of Information and communication technology Change physical equipment	No implementation strategy	**Use of Information and communication technology (intervention only)** **Who delivered the implementation strategy:** Study team (specific individuals responsible not specified) **Steps taken:** Adaptation of GAPS into an HIT-enhanced HRA, accessible via tablet. The software aggregated the responses into a real-time report separately available via secure internet connection, highlighting high-risk behaviors. Reports could be printed or uploaded into the adolescent's medical record. **Who was engaged at each step:** Providers **Change Physical Equipment (intervention only)** **Who delivered the implementation strategy:** Study team (specific individuals responsible not specified) **Steps taken:** Implies practices were provided with iPads. The web-based system was primarily accessed through Wi-Fi-enabled iPads, and iPads with cellular data service were made available to clinics without Wi-Fi. Future practices that might want to use this platform would only have to cover costs for tablets and practice facilitation. **Who was engaged at each step:** Clinic staff

Study Comparison	Implementation Strategy Domain	Strategies Used in the Intervention	Strategies Used in the Comparator	Strategy Operationalization
Richardson 2019[17] **Support clinicians (relay data)** (intervention) vs. **Educational materials** (comparator) to implement SBI for alcohol, tobacco, and drug use and depression	Train and educate stakeholders	Distribute Educational Materials	Distribute Educational Materials	**Distribute educational materials (intervention and comparator)** **Who delivered the implementation strategy:** Unclear **Steps taken:** Clinicians received 15-minute online training module orienting them to the tool, how to interpret clinician summary, and a very brief overview of the tenets of motivational interviewing. **Who was engaged at each step:** Clinicians
	Support clinicians	Facilitate relay of clinical data to providers	N/A	**Facilitate relay of clinical data to providers (intervention only)** **Who delivered the implementation strategy:** Unclear **Steps taken:** Provide a 1-page clinician summary report that included a dashboard with flags categorizing the adolescent health risks as low, moderate, or high; provided individual screening responses. **Who was engaged at each step:** Clinicians
	Engage consumers	Prepare patients to be active participants	N/A	**Prepare patients to be active participants (intervention only)** **Who delivered the implementation strategy:** Screening application **Steps taken:** Delivery of personalized feedback to motivate healthier behaviors and to encourage discussions with the clinician during the well visit. **Who was engaged at each step:** Patients
Richardson 2021[18] **Support clinicians (relay data)** (intervention) vs. **Educational materials** (comparator) to implement SBI for alcohol, tobacco, and drug use and depression	Train and educate stakeholders	Distribute educational materials	Distribute educational materials	**Distribute educational materials (intervention and comparator)** **Who delivered the implementation strategy:** Study team **Steps taken:** Clinicians receive 15-minute online training module orienting them to the electronic tool and how to interpret clinician summary. **Who was engaged at each step:** Clinicians

Study Comparison	Implementation Strategy Domain	Strategies Used in the Intervention	Strategies Used in the Comparator	Strategy Operationalization
Richardson 2021[18] **Support clinicians (relay data)** (intervention) **vs. Educational materials** (comparator) to implement SBI for alcohol, tobacco, and drug use and depression (continued)	Support clinicians	Facilitate relay of clinical data to providers	N/A	**<u>Facilitate relay of clinical data to providers (intervention only)</u>** **Who delivered the implementation strategy:** Study team **Steps taken:** The electronic tool generates a 1-page clinician summary of adolescent-reported behaviors. The report included a dashboard with flags categorizing the adolescent health risks as low, moderate or high within 6 different areas. Individual screening responses were provided below the dashboard so that clinicians could examine which specific behaviors resulted in a flag. **Who was engaged at each step:** Clinicians
	Engage consumers	Prepare patients to be active participants	N/A	**<u>Prepare patients to be active participants (intervention only)</u>** **Who delivered the implementation strategy:** Automated through electronic tool **Steps taken:** The electronic tool delivers personalized feedback based on adolescent responses through a combination of education, tips for change, and motivational messaging, including positive reinforcement for adolescents who did not engage in risks and messages to motivate behavior change when risks were present using a combination of nonnative feedback comparing adolescent-reported risks to peer reports, guidelines, and goal setting. This second version of the tool includes increased image-based feedback vs. text as well as added functionality to allow participants to choose to see more vs. less information on each topic and to receive more information about topics of interest in the form of a 1-time text or email. **Who was engaged at each step:** Patients
Walter 2021[19] **Behavioral health incorporation with learning collaborative** (intervention) vs. **No comparator** to implement SBIRT for behavioral, social, and emotional screening	Provide interactive assistance	Clinical supervision Ongoing consultation	N/A	**<u>Clinical supervision (intervention only)</u>** **Who delivered the implementation strategy:** Integration managers, CAP consultants **Steps taken:** Integration managers provided BHCs with ~1 to 2 hours/month of individual telephonic consultation and 1 hour/month of televideo case consultations. CAPs provided telephone consultations to PCPs on demand 8 hours/day, 5 days/week. **Who was engaged at each step:** Practice PCPs **<u>Ongoing consultation (intervention only)</u>** **Who delivered the implementation strategy:** Program and integration managers, quality improvement consultants **Steps taken:** ~10 hours/year of in-person or televideo support were provided to PCPs, medical home CCs, and other practice staff. These group sessions addressed clinical and business workflows; billing and revenue cycle management; BHC hiring, contracting, and/or credentialing; crisis plans; linkages to specialty services; EHR documentation and decision support; and support for practice-individualized quality improvement projects. The sessions were supplemented by ~3 hours/month of individualized practice-based support. **Who was engaged at each step:** Practice PCPs, CCs, and other practice staff

Study Comparison	Implementation Strategy Domain	Strategies Used in the Intervention	Strategies Used in the Comparator	Strategy Operationalization
Walter 2021[19] **Behavioral health incorporation with learning collaborative** (intervention) **vs. No comparator** to implement SBIRT for behavioral, social, and emotional screening (continued)	Develop relationships with internal and external partners	Change organizational culture	N/A	**Change organizational culture (intervention only)** **Who delivered the implementation strategy:** Off-site BHIP clinical/operational teams, executive leadership of the affiliated entities, Massachusetts Child Psychiatry Access Program **Steps taken:** Secure ongoing support from practice leadership. On-site teams were supported by off-site BHIP clinical; operational teams were supported by the executive leadership of the affiliated entities. **Who was engaged at each step:** On-site practice-based BH teams comprised of PCPs, BHCs hired by practices after program launch, and practices' medical home CCs
	Train and educate stakeholders	Learning collaborative Conduct educational meetings	N/A	**Learning collaborative (intervention only)** **Who delivered the implementation strategy:** Affiliated academic medical center faculty **Steps taken:** Practices (1) designate ~1 PCP and ~1 additional clinical (BHC) and/or office staff to attend the BHIP education component and disseminate learned information throughout the practice; the core didactic BHIP education component (BHLC) was delivered by affiliated academic medical center faculty to practice-based BH teams in 10 1- or 2-hour sessions (17 hours total), primarily in the first enrollment year. Most sessions were delivered in person in a geographically central location, with several sessions delivered by televideo. Twenty Category 1 continuing medical education and 25 Type IV maintenance of certification credits were offered to physician BHLC participants through the affiliated medical school; discipline-specific credits were also offered to other professionals. BHLC activities targeted at key BH competencies for pediatricians delineated by the American Academy of Pediatrics, the core didactic sessions addressed purposes and processes of collaborative care; the stepped-care model of universal BH screening; focused assessment of BH problems, including the use of symptom rating scales; phenomenology, etiology, and management of mild and/or moderate presentations of the target disorders (anxiety, depression, and ADHD) and related problems (stress-trauma reactions, disruptive behavior, and suicide); guideline-congruent, first-line medications for target disorders; focused psychotherapy; guided self-management for patients and/or family with followup for subclinical problems; and referral to specialty BH care for severe, complex, unsafe, and/or refractory presentations. **Who was engaged at each step:** Practice PCPs and clinical and/or office staff **Conduct educational meetings (intervention only)** **Who delivered the implementation strategy:** Affiliated academic medical center faculty **Steps taken:** BHCs received 8 hours/year of additional didactic sessions targeted at their specific learning needs. **Who was engaged at each step:** BHCs

Study Comparison	Implementation Strategy Domain	Strategies Used in the Intervention	Strategies Used in the Comparator	Strategy Operationalization
Walter 2021[19] **Behavioral health incorporation with learning collaborative** (intervention) **vs. No comparator** to implement SBIRT for behavioral, social, and emotional screening (continued)	Support clinicians	Create new clinical team (to incorporate) Change record system to facilitate relay of clinical data to providers	N/A	**<u>Create new clinical team (to incorporate) (intervention only)</u>** **Who delivered the implementation strategy:** Participating practices **Steps taken:** Create BH care team; standardize roles, communication channels, clinical protocols, structures, processes, and outcomes for BH care; on-site, billable clinical services comprised BH screening by PCPs; BH assessment and treatment visits to PCPs and BHCs; and PCP prescription of psychotropic medications for anxiety, depression, and ADHD; unbilled BH care coordination was provided by CCs. **Who was engaged at each step:** N/A **<u>Change record system to facilitate relay of clinical data to providers (intervention only)</u>** **Who delivered the implementation strategy:** BHIP practice teams with support from program and integration managers and QI consultants **Steps taken:** Modified EHR to incorporate BH documentation, outcome and referral tracking, and billing. **Who was engaged at each step:** Participating practices

[a] Not enough information to code the specific ERIC-EPOC implementation strategy used in the study.

Abbreviations: ADHD = attention deficit hyperactivity disorder; BHC = behavioral health clinician; BHIP = behavioral health incorporation program; BHLC = behavioral health learning collaborative; CAP = child and adolescent psychiatrist; CC = care coordinator; EHR = electronic health record; EPOC = Effective Practice and Organisation of Care; ERIC = Expert Recommendations for Implementing Change GAPS = Guidelines for Adolescent Preventive Services; HIT = health information technology; HRA = health risk assessment; NA = not applicable; PCP = primary care provider; QI = quality improvement.

Contextual Question 1

We found two cluster RCTs conducted outside the United States that compared different strategies for implementing screening and either brief intervention or referral for a range of behavioral health risk factors.[21, 22] The first study assessed the use of a multicomponent implementation strategy versus a comparison arm receiving a single educational seminar to improve screening and counseling for multiple psychosocial risk factors among 901 adolescents and young adults ages 14 to 24 years.[21] The study was conducted in 40 general practices in Victoria, Australia, and involved at least one interested clinician (GP or nurse) at each practice. The study assessed a multicomponent **clinician training** implementation approach to introduce clinicians and practice support staff (i.e., receptionists and practice managers) at implementation practices to screening for health risk behaviors and help them integrate screening into office and clinical procedures.[21]

The second study assessed the integration of a 2.5-day training on managing common child mental health problems with SBI for GPs into an existing adult collaborative care program in Tehran, Iran.[22] A total of 49 GPs caring for 389 children ages 5 to 15 years (regardless of their reasons for seeking care) were enrolled in the study. This study assessed a **clinician training** implementation approach via an interactive 2.5-day training on managing common child mental health problems for GPs already practicing in an existing adult collaborative care program to help them more often identify child mental health problems, engage families, and provide brief interventions.[22]

Included Studies

KQ 1

1. Gryczynski J, Monico LB, Garrison K, et al. Sustainability of adolescent screening and brief intervention services in primary care after removal of implementation supports. J Stud Alcohol Drugs. 2023 Jan;84(1):103-8. doi: 10.15288/jsad.21-00324. PMID: 36799680.
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CQ 1

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Excluded Studies

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Appendix C. Risk of Bias Assessments for Included Studies

Risk of bias ratings by study design for each included study are reported in **Table C-1, Table C-2, Table C-3,** and **Table C-4**. We report ratings for each domain, overall ratings, and comments justifying overall ratings when necessary. Domain and overall ratings apply to all outcomes in a study unless otherwise indicated.

Table C-1. Risk of bias ratings for randomized controlled trials

Study	Domain 1	Domain 2b	Domain 3	Domain 4	Domain 5	Overall	Comments
Knight 2019[10]	Some concerns	Some concerns	Some concerns	Low	Low	Some concerns	Potential deviations from the intervention (providers trained to provide counseling treated UC and cSBI participants) and missingness (individuals who engaged in substance use behaviors may be less likely to return for followup visits with provider).
Richardson 2019[17]	Low	Some concerns	Low	Low	Low	Some concerns	Bias would have most likely diluted the effect as being a part of the study and receiving training and education on the use of the tool and MI; may have resulted in an unintended boost in delivery of counseling by providers caring for patients randomized to UC.
Richardson 2021[18]	Low	Some concerns	Low	Low	Low	Some concerns	None

cSBI = computerized screening and brief intervention; MI = motivational interviewing; UC = usual care.
Domain 1: Bias due to randomization.
Domain 2b: Bias due to deviations from intended interventions (effect of adhering to intervention).
Domain 3: Bias due to missing data.
Domain 4: Bias in measurement of outcomes.
Domain 5: Bias in selection of the reported result.

Table C-2. Risk of bias ratings for cluster-randomized controlled trials

Study	Domain 1a	Domain 1b	Domain 2	Domain 3	Domain 4	Domain 5	Overall	Comments
Mitchell 2020[12]	Low	Low	Low	Low	Low	Low	Low	None
Sterling 2015[15]	Some concerns	Low	Low	Low	Low	Low	Some concerns	Some concerns with randomization due to baseline differences in the patient population

Domain 1a: Bias due to randomization.
Domain 1b: Bias due to the timing of identification or recruitment.
Domain 2: Bias due to deviations from intended interventions (effect of adhering to intervention).
Domain 3: Bias due to missing data.
Domain 4: Bias in measurement of outcomes.
Domain 5: Bias in selection of the reported result.

Table C-3. Risk of bias ratings for non-randomized controlled trials[a]

Study	Domain 1	Domain 2	Domain 3	Domain 4	Domain 5	Domain 6	Domain 7	Overall	Comments
Harder 2019[7]	High	Low	Low	No information	Low	Low	No information	High	High risk of bias due to confounding, no information about deviations from intended intervention or selection of reported results. Adjustment for some confounders, but residual confounding likely.
Dalal 2023[6]	High	Low	Low	No information	Low	No information	No information	High	Pediatricians self-selected into the QI group and were therefore more motivated to integrate what they learned through the study's active-learning activities than control providers would have been. This bias is not accounted for by the study's analysis and would have affected all outcomes.
Walter 2021[19]	High	Low	Low	No Information	Some concerns; low for adoption and penetration	Some concerns	Low	High	High risk of bias for the confounding domain and moderate ROB in the missing data domain, which leads to overall rating of high risk of bias.
Thompson 2016[16]	Some concerns	Some concerns	Low	No information	High	Low	No information	High	Missingness of data by group was not reported, and because potential ROB due to missing data was the most significant potential source of bias, it is unclear which direction the bias would favor.
Gooding 2017[9]	High	Low	Low	High	High; low for documented and self-reported ED screening rates	Low	No information	High	High risk of bias due to potential confounding. No adjustment for confounding and no information about deviations from intended intervention.

[a] To assess the risk of bias in the included studies, we used the Cochrane Risk of Bias 2 (RoB 2.0) tool for individually randomized parallel-group trials, the RoB 2 extension for cluster-randomized parallel-group trials, the Risk Of Bias In Non-randomized Studies of Interventions (ROBINS-I) tool for nonrandomized studies of interventions with concurrent controls, and the Effective Public Health Practice Project tool for interrupted time series analysis. Because the risk of bias tools use different terminologies for different risk of bias categories, we harmonized the terminology for this report. Further details are reported in Section 1.4.

ED = eating disorder; QI = quality improvement; ROB = risk of bias.

Domain 1: Bias due to confounding.

Domain 2: Bias due to selection of participants.

Domain 3: Bias in classification of interventions.

Domain 4: Bias due to deviations from intended interventions.
Domain 5: Bias due to missing data.
Domain 6: Bias in measurement of outcomes.
Domain 7: Bias in selection of the reported result.

Table C-4. Risk of bias ratings for interrupted time series studies[a]

Study	Domain 1	Domain 2	Domain 3	Domain 4	Domain 5	Domain 6	Domain 7	Comments
Baum 2020[8]	Some concerns	Some concerns	High	High	Some concerns	Some concerns	High	No adequate statistical analysis (i.e., only a simple time trend analysis was used). Also, insufficient reporting of baseline characteristics about providers across the 4 participating clinics to determine whether factors like lead physicians' years of experience may have potentially affected outcomes.

[a] To assess the risk of bias in the included studies, we used the Cochrane Risk of Bias 2 (RoB 2.0) tool for individually randomized parallel-group trials, the RoB 2 extension for cluster-randomized parallel-group trials, the Risk Of Bias In Non-randomized Studies of Interventions (ROBINS-I) tool for nonrandomized studies of interventions with concurrent controls, and the Effective Public Health Practice Project tool for interrupted time series analysis. Because the risk of bias tools use different terminologies for different risk of bias categories, we harmonized the terminology for this report. Further details are reported in Section 1.4.
Domain 1: Intervention independent of other changes.
Domain 2: Shape of the intervention effect pre-specified.
Domain 3: Intervention unlikely to affect data collection.
Domain 4: Knowledge of the allocated intervention adequately prevented during the study.
Domain 5: Incomplete outcome data adequately addressed.
Domain 6: Selective outcome reporting.
Domain 7: Other risks of bias.

Appendix D. Strength of Evidence Assessments

Detailed strength of evidence ratings for prioritized outcomes are reported in **Table D-1 to Table D-11**. We grouped studies by clinical area (depression, eating disorders, substance use, and general behavioral health) and implementation strategy comparison. Strength of evidence was rated as very low (one plus sign), low (two plus signs), moderate (three plus signs), or high (four plus signs).

Table D-1. SOE ratings for studies comparing a learning collaborative to no implementation strategy for screening for depression and suicide risk

Outcome	No. of Studies	Study Design	Risk of Bias	Inconsistency	Indirectness	Imprecision	Other Considerations	Findings: Learning Collaborative	Findings: No Implementation Strategy	Relative Effect (95% CI)	Absolute Effect (95% CI)	SOE and Direction of Effect
Proportion of Patients Screened (followup: range 6 months to 19 months)	2[7, 8]	Non-randomized studies	Very serious[a]	Not serious	Not serious	Serious	None	712/792 (89.9%)	579/772 (75.0%)	OR 3.53 (1.14 to 10.98)	164 more per 1,000 (from 24 more to 221 more)	⊕◯◯◯ Very low for greater effectivness of implemen-tation strategy
Sustainability (followup: mean 12 months)	2[7, 8]	Non-randomized studies	Very serious[a]	Not serious	Not serious	Not serious	None	Screening was consistent around 80% in the ITS study over 6 months following the intervention.	-	-	-	⊕◯◯◯ Very low for greater effectiveness of implemen-tation strategy
Initial plan of care in patients who screened positive (followup: mean 1 years)	1[7]	Non-randomized study	Very serious[b]	Not serious	Not serious	Not serious	None	105/129 (81.4%)	82/90 (91.1%)	OR 0.36 (0.11 to 1.16)	124 fewer per 1,000 (from 381 fewer to 11 more)	⊕◯◯◯ Very low for greater effectiveness of comparator strategy

[a] Inadequate statistical analysis in both studies; rated down 2 levels for risk of bias.
[b] No adequate adjustment for confounders; intervention group was part of learning collaborative and had probably a more positive attitude toward screening than control group; rated down 2 levels for risk of bias.
CI = confidence interval; ITS = interrupted time series; OR = odds ratio; SOE = strength of evidence.

Table D-2. SOE ratings for studies comparing clinician support to no implementation strategy for screening for depression and suicide risk

Outcome	No. of Studies	Study Design	Risk of Bias	Inconsistency	Indirectness	Imprecision	Other Considerations	Effect: Clinician Support	SOE and Direction of Effect
Proportion of Patients Screened (followup: mean 12 weeks; assessed with: Documented)	1[6]	Non-randomized study	Serious[a]	Not serious	Not serious	Not serious	None	Patients in the intervention group were significantly more likely to be screened than those in the control group after 12 weeks (94% vs. 89%, p<0.01).	⊕◯◯◯ Very low for greater effectiveness of implementa-tion strategy
Equity	1[6]	Non-randomized study	Serious[a]	Not serious	Not serious	Not serious	None	Comparable screening rates between racial minorities and White children (QI: 94.5% vs. 94.7%; non-QI: 89.7% vs. 90.7%)	⊕◯◯◯ Very low for comparable effectiveness

[a] No adequate adjustment for confounders; intervention group was part of learning collaborative and had probably a more positive attitude toward screening than control group; rated down 1 level for risk of bias.
CI = confidence interval; QI = quality improvement; SOE = strength of evidence

Table D-3. SOE ratings for studies comparing a learning collaborative to education for eating disorders

Outcome	No. of Studies	Study Design	Risk of Bias	Inconsistency	Indirectness	Imprecision	Other Considerations	Findings: Learning Collaborative	Findings: Discrete Educational Strategy	Relative Effect (95% CI)	Absolute Effect (95% CI)	SOE and Direction of Effect
Proportion of Patients Screened (documented) (followup: mean 5 weeks)	1[9]	Non-randomized study	Very serious[a]	Not serious	Not serious	Not serious	None	112/509 (22.0%)	436/7592 (5.7%)	RR 3.84 (3.18 to 4.63)	163 more per 1,000 (from 125 more to 208 more)	⊕◯◯◯ Very low for greater effectiveness of implementation strategy
Proportion of High-Risk Patients Screened (documented) (followup: mean 5 weeks)	1[9]	Non-randomized study	Very serious[a]	Not serious	Not serious	Serious[b]	None	No significant difference in the change of documented screening for high-risk patients (active learning: +15.7 percentage points [14.3% to 30%]; print learning: +5.5 percentage points [3.2% to 8.7%]; p=0.9).				⊕◯◯◯ Very low for greater effectiveness of implementa-tion strategy

[a] No adjustment for confounders; intervention group was part of learning collaborative and had probably a more positive attitude toward screening than control group; rated down 2 levels for very serious bias.
[b] Only 65 patients were screened, which does not meet optimal information size; rated down 1 level for imprecision.
CI = confidence interval; RR = risk ratio; SOE = strength of evidence.

Table D-4. SOE ratings for studies comparing behavioral health incorporation plus clinician support to clinician support only for screening, brief advice, and brief intervention for alcohol tobacco, and other drug use

Outcome	No. of Studies	Study Design	Risk of Bias	Inconsistency	Indirectness	Imprecision	Other Considerations	Effect	SOE and Direction of Effect
Reach: Screening Provided in the Implementation Phase (followup: 20 months; assessed with: observation)	1[12]	Randomized trial	Not serious	Not serious	Not serious	Not serious	None	Counts: NR; 64.1% vs. 59.2%, p=0.52	⊕⊕⊕⊕ High for comparable effectiveness
Reach: Screening Provided in the Sustainability Phase (followup: 12 months; assessed with: observation)	1[12]	Randomized trial	Not serious	Not serious	Not serious	Not serious	None	Counts: NR; 73.9% vs. 65.6%, p-value NR	⊕⊕⊕⊕ High for comparable effectiveness
Sustainability: Brief Advice Provided in the Implementation Phase (followup: 20 months; assessed with: observation)	1[12]	Randomized trial	Not serious	Not serious	Serious[a]	Serious[b]	None	49/161 (30.4%) vs. 54/191 (28.3%); adj OR=0.84 (95% CI, 0.26 to 2.70)[c]	⊕⊕◯◯ Low for comparable effectiveness
Sustainability: Brief Advice Provided in the Sustainability Phase (followup: 12 months; assessed with: observation)	1[12]	Randomized trial	Not serious	Not serious	Serious[d]	Serious[b]	None	28/85 (32.9%) vs. 55/156 (35.3%), p=0.50	⊕⊕◯◯ Low for comparable effectiveness
Sustainability: Brief Intervention Provided in the Implementation Phase (followup: 20 months; assessed with: observation)	1[12]	Randomized trial	Not serious	Not serious	Serious[e]	Serious[b]	None	7/86 (8.1%) vs. 30/79 (38.0%); adj OR=0.15 (95% CI, 0.04 to 0.56)[c]	⊕⊕◯◯ Low for greater effectiveness of comparator
Sustainability: Brief Intervention Provided in the Sustainability Phase (followup: 12 months; assessed with: observation)	1[12]	Randomized trial	Not serious	Not serious	Serious[f]	Serious[b]	None	2/52 (3.8%) vs. 28/64 (43.8%), p<0.001	⊕⊕◯◯ Low for greater effectiveness of comparator

[a] Subgroup of individuals (352 of 9,639 visits) with a CRAFFT = 1; downgraded 1 level for indirectness.
[b] Does not meet optimal information size; downgraded 1 level for imprecision.
[c] Study authors reported adjusted OR for generalist vs. specialist; adj OR for specialist vs. generalist calculated.
[d] Subgroup of individuals (241 of 4,847 visits) with a CRAFFT = 1; downgraded 1 level for indirectness.
[e] Subgroup of individuals (165 of 9,639 visits) with a CRAFFT ≥ 2; downgraded 1 level for indirectness.
[f] Subgroup of individuals (116 of 4,847 visits) with a CRAFFT ≥ 2; downgraded 1 level for indirectness.
adj = adjusted; CI, = confidence interval; CRAFFT = car, relax, alone, forget, family or friends, trouble; NR = not reported; OR = odds ratio; SOE = strength of evidence.

Table D-5. SOE ratings for studies comparing clinician support plus behavioral health incorporation compared to clinician support and no behavioral health incorporation for SBIRT for alcohol, tobacco, and other drug use

Outcome	No. of Studies	Study Design	Risk of Bias	Inconsistency	Indirectness	Imprecision	Other Considerations	Effect	SOE and Direction of Effect
Reach: Number of Assessments (followup: 24 months; assessed with: observation)	1[15]	Randomized trial	Not serious	Not serious	Not serious	Not serious	None	163/671 (24.3%) vs. 149/584 (25.5%); adj OR=0.93 (95% CI, 0.72 to 1.21)	⊕⊕⊕⊕ High for comparable effectiveness
Reach: Brief Intervention Provided (followup: 24 months; assessed with: observation)	1[15]	Randomized trial	Not serious	Not serious	Not serious	Serious[a]	None	171/671 (25.5%) vs. 96/579 (16.4%); adj OR=1.74 (95% CI, 1.31 to 2.31)	⊕⊕⊕◯ Moderate for greater effectiveness of implementation strategy
Reach: Referral to Specialty Treatment Provided (followup: 24 months; assessed with: observation)	1[15]	Randomized trial	Not serious	Not serious	Not serious	Very serious[b]	None	Counts: NR; adj OR=0.58 (95% CI, 0.43 to 0.78)	⊕⊕◯◯ Low for greater effectiveness of comparator

[a] Number of events does not meet optimal information size; downgraded 1 level for imprecision.
[b] Counts not reported; however, referral events cannot exceed brief intervention events and likely fewer; downgraded 2 levels for imprecision.
adj = adjusted; CI = confidence interval; NR = not reported; OR = odds ratio; SBIRT = screening, brief intervention, and referral to treatment; SOE = strength of evidence.

Table D-6. SOE ratings for studies comparing clinician support to usual care for alcohol, tobacco, and other drug use

Outcome	No. of Studies	Study Design	Risk of Bias	Inconsistency	Indirectness	Imprecision	Other Considerations	Effect	SOE and Direction of Effect
Reach: Brief Intervention Provided (followup: 24 months; assessed with: observation)	1[15]	Randomized trial	Not serious	Not serious	Not serious	Serious[a]	None	96/584 (16.4%) vs. 11/611 (1.8%); adj OR=10.37 (95% CI, 5.45 to 19.74)	⊕⊕⊕◯ Moderate for greater effectiveness of implementation strategy
Reach: Referral to Specialty Treatment (followup: 24 months; assessed with: observation)	1[15]	Randomized trial	Not serious	Not serious	Not serious	Very serious[b]	None	Counts: NR; adj OR=1.11 (95% CI, 0.83 to 1.49)[c]	⊕⊕◯◯ Low for comparable effectiveness

[a] Number of events does not meet optimal information size; downgraded 1 level for imprecision.
[b] Counts not reported; however, referral events cannot exceed brief intervention events and likely fewer; downgraded 2 levels for imprecision.
[c] Counts not reported.
adj = adjusted; CI = confidence interval; NR = not reported; OR = odds ratio; SOE = strength of evidence.

Table D-7. SOE ratings for studies comparing computer-facilitated screening and brief intervention to computerized screening followed by treatment as usual for alcohol, tobacco, and other drug use among high-risk adolescents[a]

Outcome	No. of Studies	Study Design	Risk of Bias	Inconsistency	Indirectness	Imprecision	Other Considerations	Effect	SOE and Direction of Effect
Mental health: Time to First Post-visit Alcohol Use (followup: 12 months; assessed with: youth self-report)	1[10]	Randomized trial	Not serious	Not serious	Not serious	Serious[b]	None	Time to first use of alcohol, median days (IQR) cSBI: 97 (51 to 222) UC: 44 (21 to 143) adj HR=0.69 (0.47 to 1.02)	⊕⊕⊕◯ Moderate for greater effectiveness of implementation strategy
Mental Health: Time to first Post-visit Heavy Episodic Drinking (followup: 12 months; assessed with: youth self-report)	1[10]	Randomized trial	Not serious	Not serious	Not serious	Serious[b]	None	Time to first heavy episodic alcohol use, median days (IQR) cSBI: 366 (124 to 366) UC: 213 (51 to 366); adj HR=0.66 (0.40 to 1.10)	⊕⊕⊕◯ Moderate for comparable effectiveness
Mental Health: Time to First Post-visit Cannabis Use (followup: 12 months; assessed with: youth self-report)	1[10]	Randomized trial	Not serious	Not serious	Not serious	Serious[b]	None	Time to first cannabis use, median days (IQR) cSBI: 101 (33 to 226) UC: 83 (27 to 152); adj HR=0.62 (0.41 to 0.94)	⊕⊕⊕◯ Moderate for greater effectiveness of implementation strategy
Address a positive screen: Delivery of advice to avoid cannabis or alcohol use; delivery of information about health risks of cannabis and alcohol use	1[10]	Randomized trial	Not serious	Not serious	Not serious	Serious[b]	None	***brief advice for alcohol use***: 105/148 (70.9) vs. 36/63 (57.1); adj RR: 1.21 (0.95 to 1.52) ***brief advice for cannabis use***: 122/148 (82.4) vs. 37/63 (58.7); adj RR: 1.36 (1.09 to 1.69) ***information about health risks of alcohol use***: 132/148 (89.2) vs. 47/63 (74.6); adj RR: 1.22 (1.04 to 1.44) ***information about health risks of cannabis use***: 117/148 (79.1) vs. 40/63 (63.5) adj RR: 1.34 (1.09 to 1.65) adj RR ranged from 1.21 to 1.36	⊕⊕⊕◯ Moderate for greater effectiveness of implementation strategy

[a] Patients who reported any substance use or riding risk at baseline.
[b] Number of events does not meet optimal information size; rated down 1 level for imprecision.
adj = adjusted; cSBI = computerized screening and brief intervention; HR = hazard ratio; IQR = interquartile range; SOE = strength of evidence; UC = usual care.

Table D-8. SOE ratings for studies comparing computer-facilitated screening and brief intervention to computerized screening followed by treatment as usual for alcohol, tobacco, and other drug use among low-risk adolescents[a]

Outcome	No. of Studies	Study Design	Risk of Bias	Inconsistency	Indirectness	Imprecision	Other Considerations	Effect	SOE and Direction of Effect
Mental Health: Time to First Post-visit Alcohol Use (followup: 12 months; assessed with: youth self-report)	1[10]	Randomized trial	Not serious	Not serious	Not serious	Serious[b]	None	Time to first use of alcohol, median days (IQR) cSBI: 366 (338 to 366) UC: 366 (334 to 366); adj HR=0.87 (0.57 to 1.31)	⊕⊕⊕◯ Moderate for comparable effectiveness
Mental Health: Time to First Post-visit Cannabis use (followup: 12 months; assessed with: youth self-report)	1[10]	Randomized trial	Not serious	Not serious	Not serious	Serious[b]	None	Time to first cannabis use, median days (IQR) cSBI: 366 (366 to 366) UC: 366 (366 to 366); adj HR=0.76 (0.44 to 1.32)	⊕⊕⊕◯ Moderate for comparable effectiveness

[a] Patients who reported no substance use or riding risk at baseline.

[b] Small sample size and wide confidence interval; downgraded 1 level for imprecision.

adj = adjusted; cSBI = computerized screening and brief intervention; HR = hazard ratio; IQR = interquartile range; SOE = strength of evidence; UC = usual care.

Table D-9. SOE ratings for studies comparing a clinician support-based implementation strategy compared to educational materials for screening and brief intervention for protective factors and risk behaviors

Outcome	No. of Studies	Study Design	Risk of Bias	Inconsistency	Indirectness	Imprecision	Other Considerations	Number of Patients: Clinician Support	Number of Patients: Educational Materials	Effect	SOE and Direction of Effect
Mental Health (risk score) (followup: 3 months; assessed with: Check Yourself; Scale from: 0 to 21)	2[17, 18]	Randomized trials	Not serious	Not serious	Not serious	Not serious	None	292	308	MD 0.19 lower (95% CI, 0.54 lower to 0.17 higher)	⊕⊕⊕⊕ High for comparable effectiveness
Mental Health (risk score) (followup: 6 months; assessed with: Check Yourself)	1[18]	Randomized trial	Not serious	Not serious	Not serious	Serious[a]	None	145	155	MD 0.12 lower (95% CI, 0.29 lower to 0.52 higher)	⊕⊕⊕◯ Moderate for comparable effectiveness
Address a positive screen (counseling for moderate risk behaviors)	2[17, 18]	Randomized trials	Not serious	Not serious	Not serious	Not serious	None	-	-	Rate ratio 1.33 (95% CI, 1.10 to 1.56)	⊕⊕⊕⊕ High for greater effectiveness of implementation strategy
Address a positive screen (counseling for moderate or high risk behaviora)	2[17, 18]	Randomized trials	Not serious	Not serious	Not serious	Not serious	None	-	-	Rate ratio 1.33 (95% CI, 1.11 to 1.56)	⊕⊕⊕⊕ High for greater effectiveness of implementation strategy

[a] Only 200 patients were screened, which does not meet optimal information size; rated down 1 level for imprecision.
CI = confidence interval; MD = mean difference; SOE = strength of evidence.

Table D-10. SOE ratings for studies comparing a behavioral health incorporation strategy to no strategy for implementing a behavioral health stepped-care model

Outcome	No. of Studies	Study Design	Risk of Bias	Inconsistency	Indirectness	Imprecision	Other Considerations	Effect	SOE and Direction of Effect
Reach (screening for risky behaviors at well visits)	1[19]	Non-randomized study	Serious[a]	Not serious	Not serious	Not serious	None	Behavioral health screening increased from 55.6% in the control period to 73.9% in the implementation period, with an adjusted odds ratio (95% CI) of 1.25 (1.21 to 1.29); p <0.001.	⊕◯◯◯ Very low for greater effectiveness of implementation strategy
Address Positive Screen (primary care behavioral health visits)	1[19]	Non-randomized study	Serious[a]	Not serious	Not serious	Not serious	None	Behavioral health visits to address positive screen increased from 107 visits per 1,000 patient-years in the control period to 177 visits per 1,000 patient-years in the implementation period, with an adjusted rate ratio (95% CI) of 1.2 (1.1 to 1.3); p<0.001 adjusted for secular trends.	⊕◯◯◯ Very low for greater effectiveness of implementation strategy
Initiation of Treatment (psychotherapy visits)	1[19]	Non-randomized study	Serious[a]	Not serious	Not serious	Not serious	Strong association	Psychotherapy visits increased from 15 visits per 1,000 patient-years in the control period to 176 visits per 1,000 patient-years in the implementation period, with an adjusted rate ratio (95% CI) of 6.7 (5.8 to 7.7); p<0.001 adjusted for secular trends.	⊕⊕◯◯ Low for greater effectiveness of implementation strategy
Initiation of Treatment (guideline-congruent ADHD prescription)	1[19]	Non-randomized study	Serious[a]	Not serious	Not serious	Not serious	None	No difference in guideline-congruent prescribing for ADHD medications between the control period and implementation period [Control period: 254 rates per 1,000 patient-years, implementation period: 362 rates per 1,000 patient-years, adjusted rate ratio (95% CI): 1.01 (0.96 to 1.07); p=0.60].	⊕◯◯◯ Very low for comparable effectiveness
Initiation of Treatment (guideline-congruent SSRI prescription)	1[19]	Non-randomized study	Serious[a]	Not serious	Not serious	Not serious	None	Guideline-congruent SSRI prescriptions increased from 57 per 1,000 patient-years in the control period to 190 per 1,000 patient-years in the implementation period, with an adjusted rate ratio (95% CI) of 1.3 (1.2 to 1.4); p<0.001.	⊕◯◯◯ Very low for greater effectivenes of implementation strategy

[a] Study was high risk of bias; rated down 1 level for risk of bias.

ADHD = attention deficit hyperactivity disorder; CI = confidence interval; SSRI = selective serotonin reuptake inhibitor; SOE = strength of evidence.

Table D-11. SOE ratings for a technology-based strategy compared to no strategy for implementing screening for risky behaviors and emotions

Outcome	No. of Studies	Study Design	Risk of Bias	Inconsistency	Indirectness	Imprecision	Other Considerations	Effect	SOE and Direction of Effect
Reach (rate of screening)	1[16]	Non-randomized study	Serious[a]	Not serious	Not serious	Serious[b]	None	Adolescents in the intervention group were more likely to report receiving screening for risky behaviors (0.36 vs. 0.05, p=0.03) and screening for depression, mental health, emotions problems and healthy relationships (0.42 vs. 0.08, p<0.01).	⊕◯◯◯ Very low for greater effectiveness of implementation strategy

[a] Moderate risk of bias for confounding domain because sites were in charge of recruitment. Serious risk of bias in the missing data domain due to >50% missing data. This makes for an overall serious risk of bias.
[b] Lack of precision due to high rate of missing data.
SOE = strength of evidence.

Appendix E. Detailed Findings

Table E-1. Evidence from studies on depression

Study	Implementation Outcomes	Service Outcomes	Patient Outcomes	Other Factors	Subgroups, Effect Modifiers
Dalal, 2023[6] Nonrandomized controlled trial **Support clinicians** (intervention) vs. **No strategy** (comparator) to implement screening for depression and suicide risk Risk of bias: High Dalal, 2023[6]	**Reach** PSC-17 first-stage screening rates among children Intervention: 836[a] (93.8%) Comparator: 1,565[a] (89.1%) Between-group p<0.001 **Fidelity** Second-stage PHQ-9 screening following a positive PSC-17 screen Intervention: 80 (54.8%) Comparator: 46 (16.4%) Between-group p<0.001 Provider use of tools to facilitate implementation: Although this study provided a standardized template ("Smart Phrase") in the EHR to help guide QI-participating pediatricians, only about half of the group consistently used the template and the rest relied on documentation with free text notes.	**Equity** Reach: First-stage PSC-17 screening rates among Non-White and/or Hispanic children Intervention: Not reported (94.5%) Comparator: Not reported (89.7%) PSC-17 first-stage screening rates among on-Hispanic White children Intervention: Not reported (94.7%) Comparator: Not reported (90.7%) Between-group p's not reported, but no statistically significant difference in first-stage screening rates between children from racial/ethnic minority groups and non-Hispanic White children within either the QI arm (p=0.95) or non-QI arm (p=0.65) Fidelity: Second-stage PHQ-9 screening following a positive PSC-17 screen among non-White and/or Hispanic children Intervention: Not reported (69.2%) Comparator: Not reported (19.4%) Second-stage PHQ-9 screening following a positive PSC-17 screen among non-Hispanic White children Intervention: Not reported (56.3%)	**Mental Health** Risk prevalence in first-stage screening with PSC-17-OVR Intervention: 76 (8.5%) Comparator: 176[a] (10.0%) Risk prevalence in first-stage screening with PSC-17-INT Intervention: 133 (14.9%) Comparator: 246[a] (14.0%) Risk prevalence in first-stage screening with either or both PSC-17-OVR and PSC-17-INT Intervention: 146 (16.4%) Comparator: 279[a] (15.9%)	**Urbanicity** Practices engaged in the clinician support-based approach had a smaller presence in Federally qualified/certified rural areas (11% vs 28%; p<0.001) and a greater presence in the largest metropolitan area (47% vs 31%; p<0.001)	NR

Study	Implementation Outcomes	Service Outcomes	Patient Outcomes	Other Factors	Subgroups, Effect Modifiers
Nonrandomized controlled trial **Support clinicians** (intervention) vs. **No strategy** (comparator) to implement screening for depression and suicide risk Risk of bias: High (continued)		Comparator: Not reported (15.8%) Between-group p's not reported, but no statistically significant difference in first-stage screening rates between children from racial/ethnic minority groups and non-Hispanic White children within either the QI arm (p=0.39) or non-QI arm (p=0.64)			
Harder, 2019[7] Nonrandomized controlled trial **Learning Collaborative** (intervention) vs. **No Strategy** (comparator) to implement screening for depression and suicide risk Risk of bias: High	**Reach** Screened for depression in 2012 (when learning collaborative occurred, using annual sample) Intervention: 264/792 (37%) Comparator: 261/772 (39%) p=0.37 Screened for depression in 2014 (during 1-year followup, using annual sample) Intervention: 712/792 (90%) Comparator: 579/772 (75%) p<0.001 AOR 3.53 (95% CI, 1.14 to 10.98, p<0.05) **Fidelity** Screened using a validated tool in 2014 (during 1-year followup, using annual sample) Intervention: 607/792 (77%) Comparator: 246/772 (32%) Chi-square=316.1, P<0.001 AOR: 37.51 (95% CI, 7.67 to 183.48, p<0.0005)	**Address a Positive Screen** Patients who screened positive **with an initial plan of care** documented in 2014 (during 1-year followup, using annual sample) Intervention: 105/129 (81%) Comparator: 82/90 (91%) p=0.05 AOR: 0.36 (95% CI, 0.11 to 1.16)	**Mental Health** Screened positive in 2014 (during 1-year followup, using annual sample) Intervention: 129/712 (18%) Comparator: 90/579 (16%)	**Process** Adoption of a standardized template in the electronic health record to increase screening rates was inconsistent; only about half of the pediatricians utilized it, while others preferred free text notes over the structured templates	N/A

Study	Implementation Outcomes	Service Outcomes	Patient Outcomes	Other Factors	Subgroups, Effect Modifiers
Baum 2020[8] Interrupted time series (quality improvement centerline shift analysis) **Learning collaborative** (intervention) vs. **No comparator** to implement an SBIRT management bundle for depression Risk of bias: High	**Reach** Rate of screening at participating practices Baseline: 0% 3 months: 28% 6 months: 81% 9 months: 86% **Sustainability** 6 months after the intervention, screening was consistent at around 80% once practices standardized the process for form completion.	NR	NR	**Documentation** Prior to the start of the project, practices reported that depression screening was not a standard practice and among a sample of 15 charts, 0 percent had documented screening at baseline Change from baseline in documentation of the depression bundle Pre-intervention: 59% 6 months: 86% 12 months: 100%	NR

[a] Value calculated by authors

AOR = adjusted odds ratio; CI = confidence interval; EHR = electronic health record; NR = not reported; PHQ-9 = Patient Health Questionnaire; PSC-INT = Pediatric Symptom Checklist internalizing subscale; PSC-OVR = Pediatric Symptom Checklist overall psychosocial functioning = QI, quality improvement; vs. = versus.

Table E-2. Evidence from studies on eating disorders

Study	Implementation Outcomes	Service Outcomes	Patient Outcomes	Other Factors	Subgroups, Effect Modifiers
Gooding, 2017[9] Nonrandomized controlled trial **Learning collaborative** (intervention) vs. **Educational materials** (comparator) to implement screening for eating disorders Risk of bias: High	**Reach** Percentage of patients screened (documented) Pre-intervention Intervention: 11/232 (4.7%) Comparator: 167/3,673 (4.5%) Post-intervention Intervention: 112/509 (22%) Comparator: 436/7,592 (5.7%) Absolute difference Intervention: 17.3 (95% CI, 12.7 to 21.8) Comparator: 1.2 (95% CI, 0.3 to 2.1) p<0.001 Percentage of patients screened (self-reported) Pre-intervention Intervention: 65.9% Comparator: 45.6% Post-intervention Intervention: 70.8% Comparator: 49.7% Absolute difference Intervention: 4.9 Comparator: 4.1 p=0.8 Percentage of high-risk patients screened (documented) Pre-intervention Intervention: 3/21 (14.3%) Comparator: 10/312 (3.2%) Post-intervention Intervention: 12/40 (30%) Comparator: 53/611 (8.7%) Absolute difference Intervention: 15.7 (95% CI, -4.9 to 36.4) Comparator: 5.5 (95% CI, 2.8 to 8.4) p=0.9 Percentage of high-risk patients screened (self-reported) Pre-intervention Intervention: 80.0% Comparator: 83.5%	NR	NR	**Provider type** Most of the practitioners were physicians (74% vs 76%) and had been in practice for about 20 years (20.4 years vs 19.6 years); the other providers were either nurse practitioners or physician assistants **Documentation** At the outset of the study, only 4.5% of patients seen by practitioners in both groups had documented screening for eating disorders in their medical charts **Knowledge** Estimated prevalence of eating disorders in the United States by practitioners during pre-period (perceived need for screening) Intervention: 13% Comparator: 10% p=0.559 Median knowledge score among practitioners (range) out of 12 Intervention: 11 (6-12) Comparator: 7 (1-10) **Satisfaction** Practitioners in the active-learning group reported greater increases in satisfaction with the training they had received regarding eating disorder screening and diagnosis relative to the print-learning group (p<0.01). Changes in satisfaction with the training to medically monitor patients with an eating disorder were not significantly different between the active-learning and print-learning groups.	NR

Study	Implementation Outcomes	Service Outcomes	Patient Outcomes	Other Factors	Subgroups, Effect Modifiers
Gooding, 2017[9] Nonrandomized controlled trial **Learning collaborative** (intervention) vs. **Educational materials** (comparator) to implement screening for eating disorders Risk of bias: High (continued)	Post-intervention Intervention: 89.2% Comparator: 85.6% Absolute difference Intervention: 9.2% Comparator: 2.2% p=0.2				

CI, confidence interval; NR = not reported.

Table E-3. Evidence from studies on alcohol, tobacco, and substance use disorders

Study	Implementation Outcomes	Service Outcomes	Patient Outcomes	Other Factors	Subgroups, Effect Modifiers
Knight, 2019[10] Gibson, 2021[11] Randomized controlled trial **Clinician support** (intervention) vs. **Technology only** (comparator) to implement SBI for alcohol, marijuana, and other drug use Risk of bias: Some concerns	NR	**Address a Positive Screen (other than through initiation of treatment)** *Intervention effect cohort (i.e., high-risk patients)* Youth reported receiving advise about cannabis use, adj RR Intervention vs. Comparator: 1.36 (95% CI, 1.09 to 1.69) Youth reported receiving advise about avoiding alcohol use, adj RR Intervention vs. Comparator: 1.21 (95% CI, 0.95 to 1.52) Youth reported receiving advise about not riding with an impaired driver, adj RR (95% CI) Intervention vs. Comparator: 1.31 (1.09 to 1.57) Youth reported receiving advice about not driving while impaired, adj RR (95% CI) Intervention vs. Comparator: 1.24 (1.03 to 1.50) Youth reported receiving information about the health risks of alcohol use, adj RR (95% CI) Intervention vs. Comparator: 1.22 (1.04 to 1.44) Youth reported receiving information about the health risks of cannabis use, adj RR (95% CI)	**Mental Health** *Intervention effect cohort (i.e., high-risk patients)* (N=211; Intervention: 148; Comparator: 63)[b] Time to first post-visit use of alcohol, median days (IQR) Intervention: 97 (51 to 222) Comparator: 44 (21 to 143) Intervention vs. Comparator: adj HR (95% CI) = 0.69 (0.47 to 1.02) Time to first post-visit heavy episodic drinking, median days (IQR) Intervention: 366 (124 to 366) Comparator: 213 (51 to 366) Intervention vs Comparator: adj HR (95% CI) = 0.66 (0.40 to 1.10) Time to first post-visit cannabis use, median days (IQR) Intervention: 101 (33 to 226) Comparator: 83 (27 to 152) Intervention vs. Comparator: adj HR (95% CI) = 0.62 (0.41 to 0.94) Met criteria for high risk of substance use, N (%) 59 (28.1) *Prevention effect cohort (i.e., low-risk patients)* (N=658; Intervention: 478, Comparator: 180) Time to first post-visit	**Self-efficacy** Providers confidence in discussing substance use with patients increased at least slightly Intervention: 81.7% Comparator: 80% Providers confidence in discussing substance use with patients increased greatly or moderately Community practice PCPs: 60.0% Hospital-based PCPs: 25.0% p = 0.013 **Satisfaction** The cSBI was generally well-received by patients **Compatibility** Some providers expressed reservations regarding the use of tablets to administer screenings and some also expressed concerns about the additional time required for the cSBI and suggested that it be incorporated into the EHR to minimize disruptions to clinical workflows and decrease the amount of time required to administer it	NR

Study	Implementation Outcomes	Service Outcomes	Patient Outcomes	Other Factors	Subgroups, Effect Modifiers
Knight, 2019[10] Gibson, 2021[11] Randomized controlled trial **Clinician support** (intervention) vs. **Technology only** (comparator) to implement SBI for alcohol, marijuana, and other drug use Risk of bias: Some concerns (continued)		Intervention vs. Comparator: 1.34 (1.09 to 1.65) Youth reported receiving the Contract for Life, N (%) Intervention: 42/55 (76.4) Comparator: 141/178 (79.2) Youth reported receiving advise about alcohol use Intervention vs. Comparator: NS Youth reported being asked to return for a followup visit, N (%)[a] Intervention: 27/59[b] (45.8) Comparator: 6/23 (26.1) Intervention vs. Comparator: NS *Prevention effect cohort (i.e., low-risk patients)* Youth reported receiving advice about avoiding alcohol use, adj RR Intervention vs. Comparator: 1.30 (95% CI, 1.17 to 1.43)	alcohol use, median days (IQR) Intervention: 366 (338 to 366) Comparator: 366 (334 to 366) Intervention vs Comparator: adj HR (95% CI) = 0.87 (0.57 to 1.31) Time to first post-visit cannabis use, median days (IQR) Intervention: 366 (366 to 366) Comparator: 366 (366 to 366) Intervention vs. Comparator: adj HR (95% CI) = 0.76 (0.44 to 1.32) **Satisfaction: Patient acceptability** *Intervention effect cohort* Rating of the advise received: Intervention vs. Comparator: no difference Satisfaction with visit Intervention vs. Comparator: no difference *Prevention effect cohort* Rating of information received as excellent or good: Intervention vs. Comparator: favors Intervention Overall satisfaction Intervention vs. Comparator: no difference		

Study	Implementation Outcomes	Service Outcomes	Patient Outcomes	Other Factors	Subgroups, Effect Modifiers
Mitchell, 2020[12] Gryczynski, 2023[14] Cluster randomized controlled trial **Behavioral health incorporation** (intervention) vs. **Clinician support only** (comparator) to implement SBIRT for alcohol and other drug use Risk of bias: Low	**Implementation Costs** SBIRT marginal cost per patient with a positive screen for brief intervention Intervention: $6.72 Comparator: $6.05 **Reach** Patients screened Implementation phase only Intervention: 64.1% Comparator: 59.2% Intervention vs. comparator: p=0.52 **Sustainability** Patients screened Sustainability phase only Intervention: 73.9% Comparator: 65.6% Screening provided in combined implementation and sustainability phases Intervention vs. comparator: OR=1.3 (95% CI, 0.5 to 3.3)a Screening provided Implementation phase: 62% Sustainability phase: 70% Sustainability vs. implementation: OR=1.20 (95% CI, 1.01 to 1.43) Intervention vs. comparator: NS Phase x condition: p=0.12 Brief advice provided Implementation phase See next column Brief advice provided in the sustainability phase only Intervention: 28/85 (32.9%)	**Address a positive screen** Brief advice provided Implementation phase only Intervention: 49/161 (30.4%) Comparator: 54/191 (28.3%) Intervention vs comparator: p=0.77 Intervention vs. Comparator: adj OR=0.84 (95% CI: 0.26 to 2.70) Brief intervention provided Implementation phase only Intervention: 7/86 (8.1%) Comparator: 30/79 (38.0%) Comparator vs. intervention: adj OR=6.53 (1.79 to 23.90), p=0.005 Intervention vs. comparator: adj OR=0.15 (0.04 to 0.56)[a] Referral to treatment at an outside agency Intervention: 3 Comparator: 1	**Mental Health** Brief advice indicated (Substance use with CRAFFT=1) visits, N (%)[a] Intervention: 161/5406 (3.0%)[a] Comparator: 191/4233 (4.5%)[a] Positive screen/Brief intervention indicated (CRAFFT ≥2) visits, N Intervention: 83 Comparator: 77	**Program cost** SBIRT for 1 year, per site Intervention: $13,548 Comparator: $12,081	N/A

Study	Implementation Outcomes	Service Outcomes	Patient Outcomes	Other Factors	Subgroups, Effect Modifiers
Mitchell, 2020[12] Gryczynski, 2023[14] Cluster randomized controlled trial **Behavioral health incorporation** (intervention) vs. **Clinician support** (comparator) to implement SBIRT for alcohol and other drug use Risk of bias: Low (continued)	Comparator: 55/156 (35.3%) Intervention vs. comparator: p=0.50 Brief advice provided in the combined implementation and sustainability phases Intervention: 77/246 (31.3%) Comparator: 109/347 (31.4%) Intervention vs. comparator: OR=0.69 (95% CI: 0.23 to 2.17) Implementation vs. sustainability phases: p = 0.83 Condition x phase: p=0.78 Brief intervention provided Implementation phase only See next column Brief intervention provided in sustainability phase only Intervention: 2/52 (3.8%) Comparator: 28/64 (43.8%) Intervention vs. comparator: p<0.001 Brief intervention provided in combined implementation and sustainability phases Intervention: 9/138 (6.5%) Comparator: 58/143 (40.1%) Intervention vs. comparator: OR=0.12 (95% CI: 0.04 to 0.36) Phase x condition: p=0.34				

Study	Implementation Outcomes	Service Outcomes	Patient Outcomes	Other Factors	Subgroups, Effect Modifiers
Mitchell, 2020[12] Gryczynski, 2023[14] Cluster randomized controlled trial **Behavioral health incorporation** (intervention) vs. **Clinician support** (comparator) to implement SBIRT for alcohol and other drug use Risk of bias: Low (continued)	**Fidelity** Received feedback only (although feedback and brief intervention is recommended), N (%) Intervention: 9 (10.8%) Comparator: 8 (10.4%) Patient declined brief intervention Intervention: 21/86 Comparator: 3/79				
Sterling, 2015[15] Cluster randomized controlled trial **Behavioral health incorporation with clinician support** (intervention) vs. **Clinician support only** (comparator) vs. **No strategy** (usual implementation) to implement implement SBIRT for substance use Risk of bias: Some concerns	**Reach** Total number of assessments, N (%) Intervention: 163 (24.3%) Comparator: 149 (25.5%) Intervention vs. Comparator: p= 0.44 Intervention vs. comparator: adj OR=0.93 (95% CI: 0.72 to 1.21), p=0.60	**Address a Positive Screen** Provided brief interventions, N (%) Intervention: 171 (25.5%) Comparator (N=579): 96 (16.4%) Usual Implementation(N=611): 11 (1.8%) Likelihood of receiving brief intervention, adj OR (95% CI) Intervention vs. Comparator: 1.74 (1.31 to 2.31), p < 0.001 Comparator vs. Usual Implementation: 10.37 (5.45 to 19.74), p<0.001 Intervention vs Usual Implementation: 18.09 (9.69 to 33.77), p<0.001 Referrals to specialty treatment (substance use only, mental health only, or substance use and mental health) Intervention vs. Comparator: favors	**Mental Health** Endorsed mental health symptoms, N (%) Intervention: 244 (13.1) Comparator: 274 (17.6) Usual Implementation: 263 (14.9) Prevalence of depression symptoms, N (%) Intervention: 220 (11 .9) Comparator: 248 (15.9) Usual Implementation: 243 (13.7) Prevalence of substance use symptoms Intervention vs. Comparator vs. Usual Implementation: NS Screening triggered assessment, N Intervention: 16 Comparator: 14 Usual Implementation: 16 Patients eligible for assessments, brief	NR	Older participants in the intervention and comparator arms had higher odds of being assessed and lower odds of referral, aOR 1.14 (95% CI, 1.04 to 1.25), p=0.004 Hispanic patients across all study groups had higher odds of receiving a brief intervention (aOR 1.93 [95% CI, 1.29 to 2.87], p=0.001]) and referral (aOR 1.57 [95% CI, 1.10 to 2.23], p=0.01) compared with White patients Among pediatricians with patients eligible for assessments, brief interventions, and referrals (n=14), pediatricians who attended at least 2 trainings (7 of 14 pediatricians) vs. pediatricians who did not attend at least 2 trainings: Conducted more assessments: p<0.001

Study	Implementation Outcomes	Service Outcomes	Patient Outcomes	Other Factors	Subgroups, Effect Modifiers
Sterling, 2015[15] Cluster randomized controlled trial **Behavioral health incorporation with clinician support** (intervention) vs. **Clinician support only** (comparator) vs. **No strategy** (usual implementation) to implement implement SBIRT for substance use Risk of bias: Some concerns (continued)		Comparator, p<0.001 Comparator vs. Usual Implementation: favors Comparator, p<0.001 Likelihood of receiving referral, adj OR (95% CI) Intervention vs. Comparator: 0.58 (0.43 to 0.78), p<0.001 Comparator vs. Usual Implementation: 1.11 (0.83 to 1.49), p=0.48 Intervention vs. Usual Implementation: 0.65 (0.48 to 0.89), p=0.006	interventions, and referrals, N Intervention: 671 Comparator: 584 Usual Implementation: 616		Provided more brief interventions: p<0.001

[a] value calculated by review authors.

[b] Among 59 patients in the cSBI group with risk levels.

adj = adjusted; BHCP = behavioral health care provider; CI = confidence interval; CRAFFT = car, relax, alone, family or friends, trouble; cSBI = computerized screening and brief intervention; HR = hazard ratio; IQR = interquartile range; N/A = not applicable; NS = not significant; OR = odds ratio; RR = relative risk; SBIRT = screening, brief intervention, referral to treatment; UC = usual care; vs. = versus.

Table E-4. Evidence from studies on general behavioral health assessments

Study	Implementation Outcomes	Service Outcomes	Patient Outcomes	Other Factors	Subgroups, Effect Modifiers
Thompson, 2016[16] Nonrandomized controlled trial **Technology (computerized assessment)** (intervention) vs. **No strategy** (comparator) to implement screening for general health risks Risk of bias: High	**Reach** Adolescents in the intervention group reported significantly higher rates of screening and counseling for depression, mental health, emotions and relationships, as reflected in Young Adult Health Care Survey (YAHCS) Emotions and Relationships domain scores below: YAHCS Risky Behaviors domain score, mean (SE) (adjusted for sex, race/ ethnicity, and age) Intervention: 0.36 (0.06) Comparator: 0.05 (0.11) YAHCS Emotions and relationships domain score, mean (SE) (adjusted for sex race/ ethnicity, and age) Intervention: 0.42 (0.05) Comparator: 0.08 (0.09) Difference between groups: p<0.01 Each domain score could range from 0 to 1, with 1 being the highest possible. The higher the number, the higher report of screening.	NR	**Satisfaction** Adolescents in the intervention group reported significantly higher rates of receiving care that was private and confidential than those in the comparator group. Importantly, these responses were not significantly different by sex, race/ethnicity, or age. YAHCS Private and confidential quality domain score, mean (SE) (adjusted for sex, race/ethnicity, and age) Intervention: 0.85 (0.04) Comparator: 0.57 (0.03) Difference between groups: p<0.0001 Sex differences were observed across both groups for one domain; females reported higher levels of helpfulness of screening and counseling compared to males: Females mean 0.84, SE 0.05; Males mean 0.61, SE 0.05 Difference between groups: p<0.01	Participating practices included Federally Qualified Health Centers (n=4), private practices (n=6), hospital-affiliated clinics (n=2), and academic medical centers (n=10); the practices varied in the proportion of their patients who were adolescents ages 14 to 18 years, with some practces (20%) having fewer than 10 percent adolescent patients and most practices (56.7%) having 10 to 50 percent adolescent patients Two-thirds of the practices (66.7%) had electronic medical records and not all practices used the same system; as such, the health risk assessment was web-based so that all practices could use it, which meant that it could not be integrated into the practices' electronic medical record systems and had to be managed separately	NR

Study	Implementation Outcomes	Service Outcomes	Patient Outcomes	Other Factors	Subgroups, Effect Modifiers
Richardson, 2019[17] Randomized controlled trial **Support clinicians (relay data)** (intervention) vs. **Educational materials** (comparator) to implement SBI for alcohol, tobacco, and drug use and depression Risk of bias: Some concerns	NR	**Address a Positive Screen (other than through initiation of treatment)**: Received counseling for reported moderate- and high-risk behaviors, aRR (95% CI) Intervention vs. Comparator: 1.32 (1.07 to 1.63) Received counseling for reported high-risk behavior, N (%) Intervention group: 40/105 (38.1) Comparator group: 21/87 (24.1) aRR (95%) Intervention vs. Comparator: 1.61 (0.95 to 2.73)	**Mental Health** Moderate risk behaviors reported, n Intervention: 314 Comparator: 319 High risk behaviors reported, n Intervention group: 105 Comparator: 87 Risk score at baseline, mean (SD) Intervention: 3.71 (2.79) Comparator: 3.39 (2.27) Intervention vs. Comparator: P=0.48 Risk score at 3 months, mean (SD) Intervention: 2.89 (2.41) Comparator: 3.25 (2.37) Intervention vs. Comparator: P=0.08 On mixed-effects linear regression analysis, youths in the intervention group had a significantly greater decrease in risk behavior scores at 3 months compared with those in the Comparator group (β=-0.48; 95% CI, -0.89 to -0.02; P=0.02).	NR	Change in number of high-risk behaviors, aRR (95% CI) Intervention vs. Comparator: 0.61 (0.43 to 0.88) Change in the number of moderate-risk behaviors, aRR (95% CI) Intervention vs. Comparator: 0.91 (0.78 to 1.07)

Study	Implementation Outcomes	Service Outcomes	Patient Outcomes	Other Factors	Subgroups, Effect Modifiers
Richardson, 2019[17] Randomized controlled trial **Support clinicians (relay data)** (intervention) vs. **Educational materials** (comparator) to implement SBI for alcohol, tobacco, and drug use and depression Risk of bias: Some concerns (continued)		Received counseling for moderate-risk behavior, N (%) Intervention group: 160/314 (51.0) Comparator group: 130/319 (40.8) aRR (95%) Intervention vs. Comparator: 1.28 (1.02 to 1.62) Received counseling for no risk behaviors, aRR (95%) Intervention vs. Comparator: 1.02 (0.77 to 1.36)	When examining for effect modification by moderate-risk or high-risk behavior status, the intervention had a significant effect on reduction in the number of high-risk behaviors in the intervention group vs the Comparator group (aRR, 0.61; 95% CI, 0.43 to 0.88), but not on the number of moderate-risk behaviors (aRR, 0.91; 95% CI, 0.78 to 1.07).		

Study	Implementation Outcomes	Service Outcomes	Patient Outcomes	Other Factors	Subgroups, Effect Modifiers
Richardson 2021[18] Nonrandomized controlled trial **Support clinicians (relay data)** (intervention) vs. **Educational materials** (comparator) to implement SBI for alcohol, tobacco, and drug use and depression Risk of bias: some concerns	NR	**Address a Positive Screen (other than through initiation of treatment)** Received clinician counseling for moderate and high-risk behaviors, aRR (95% CI) Intervention vs. control: 1.36 (1.04 to 1.78) Received clinician counseling for no/low risk behaviors, aRR (95% CI) Intervention vs. control: 1.12 (0.85 to 1.48) Received clinician counseling for moderate risk behaviors, aRR (95% CI) Intervention vs. control: 1.40 (1.09 to 1.80) Received clinician counseling for high risk behaviors, aRR (95% CI) Intervention vs. control: 1.70 (1.06 to 2.74)	**Mental Health** Depression at 6 months, n (%) Intervention (n=145): 18 (12.4%) Control (n=139): 14 (10.1% Marijuana use at 6 months, n (%) Intervention (n=145): 5 (3.4%) Control (n=139): 3 (2.2%) Alcohol use at 6 months, n (%) Intervention (n=145): 4 (2.8%) Control (n=139): 4 (2.9%) Tobacco use at 6 months, n (%) Intervention: 3 (2.1%) Control: 1 (0.7%)	NR	NR

Richardson 2021[18] Nonrandomized controlled trial **Support clinicians (relay data)** (intervention) vs. **Educational materials** (comparator) to implement SBI for alcohol, tobacco, and drug use and depression Risk of bias: some concerns (continued)	No significant differences in the reduction of risk behaviors were observed between the adolescents of the intervention and control groups, P=NR Risk behavior score at 3 months, mean (SD) Intervention: 2.68 (2.04) Control: 2.74 (2.11) Intervention vs. control: P = .81 Score difference: 0.15, β=-0.15 (95% CI, -0.25 to 0.55), P=0.47 Risk behavior score at 6 months, mean (SD) Intervention: 2.58 (1.87) Control: 2.76 (2.05) Intervention vs. control: P = .45 Score difference: 0.12, β=-0.12 (95% CI, -0.29 to 0.52), P=0.57 Difference in reduction of risk behaviors between groups at 3 months β=-0.33 (95% CI, -0.62 to -0.05), P=0.02 Difference in reduction of risk behaviors between groups at 6 months β=-0.29 (95% CI, -0.57 to -0.01), P=0.05 No significant differences in risk scores between the intervention and control groups at 3 or 6 months, P=NR **Patient Satisfaction** Satisfaction with the well-care visit process[a] Intervention vs. control: no significant difference

Study	Implementation Outcomes	Service Outcomes	Patient Outcomes	Other Factors	Subgroups, Effect Modifiers
Walter, 2021[19] Nonrandomized controlled trial (stepped-wedge trial) **Behavioral health incorporation with learning collaborative** (intervention) vs. **No comparator** to implement SBIRT for behavioral, social, and emotional screening Risk of bias: High	**Penetration** BH screening at well visits by program phase (see Figure 3): Across the combined BHIP phases, universal BH screening increased from 55.6% in the pre-implementation period to 73.9% in the continuation period. Adjusted odds ratio (95% CI): 1.25 (1.21 to 1.29); P<.001. **Adoption** Incorporation of BH In the pre-implementation phase, only 2 practices had incorporated a BHC (3%). By third quarter 2019, 37 BHCs had been incorporated into the 59 practices (63%). Incorporation of BHCs among larger vs. smaller practices Larger practices (≥3 PCPs): 77% Smaller practices (1 to 2 PCPs): 13% Between-group p<0.001	**Address a Positive Screen (other than through initiation of treatment)** PCP BH visits across the combined BHIP phases (see Figures 5 and S) (N visits per 1,000 patient-years) Pre-implementation period: 107 Continuation period: 177 Adjusted rate ratio (95% CI): 1.2 (1.1 to 1.3); p<0.001 adjusted for secular trends **Initiation of Treatment** Psychotherapy visits across the combined BHIP phases (see Figure 4) (N visits per 1,000 patient-years) Pre-implementation period: 15 Continuation period: 176 Adjusted rate ratio (95% CI): 6.7 (5.8 to 7.7); p<0.001 adjusted for secular trends Guideline-congruent ADHD prescription rates per 1,000 patient-years (see Figure 6) Pre-implementation period: 254 Continuation period: 362 Adjusted rate ratio (95% CI): 1.01 (0.96 to 1.07); p=0.60)	**Mental Health** Leading diagnoses among 9,290 unique patients with psychotherapy visits N[a] (%) Stress-related: 3,029 (32.6%) Anxiety: 2,499 (26.9%) Depression: 660 (7.1%) ADHD: 622 (6.7%) Co-occurring anxiety and depression: 632 (6.8%)	Provider types by implementation phase, mean Phase 1 (start date: July 2013) Physicians: 6.9 NPs: 3.5 PAs: 0 Phase 2 (start date: September 2014) Physicians: 3.1 NPs and/or PAs: 2.0 Phase 3 (start date: June 2015) Physicians: 3.4 NPs: 1.0 PAs: 0 Phase 4 (start date: June 2016) Physicians: 4.5 NPs: 1.4 PAs: 0 Phase 5 (start date: June 2017) Physicians: 3.7 NPs: 2.7 PAs: 0 Practice patient panel size, mean Phase 1 (start date: July 2013): 7,765 Phase 2 (start date: September 2014): 4,037 Phase 3 (start date: June 2015): 3,195 Phase 4 (start date: June 2016): 4,726 Phase 5 (start date: June 2017): 5,012	

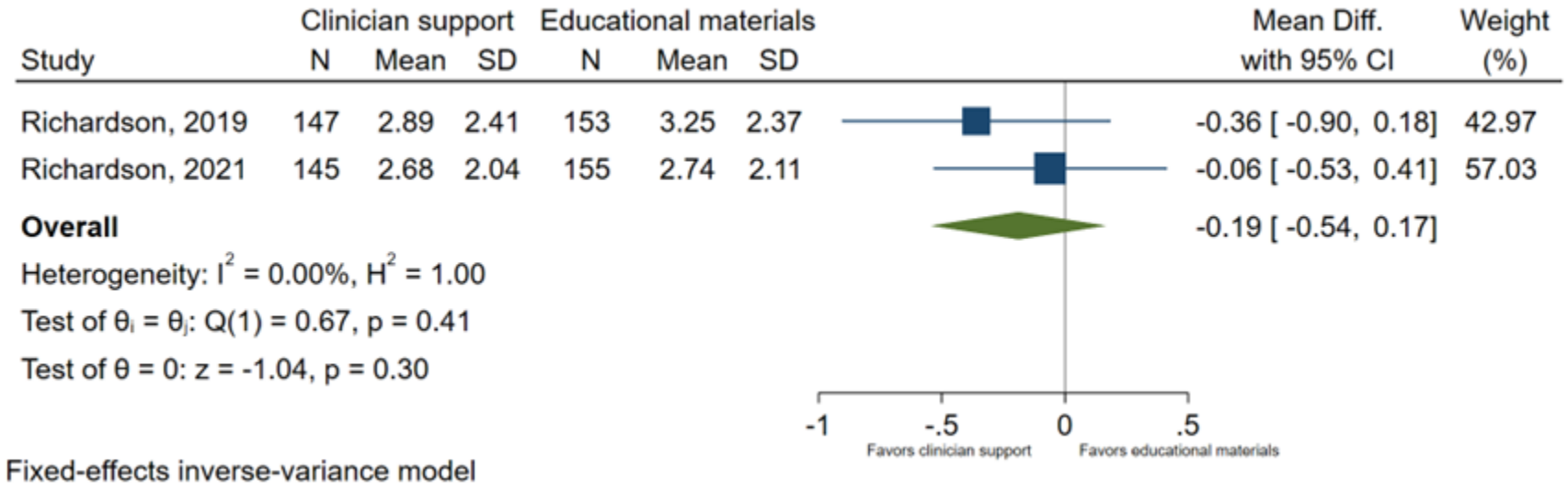
Walter, 2021[19] Nonrandomized controlled trial (stepped-wedge trial) **Behavioral health incorporation with learning collaborative** (intervention) vs. **No comparator** to implement SBIRT for behavioral, social, and emotional screening Risk of bias: High (continued)	Guideline-congruent selective SSRI prescription rates per 1,000 patient-years (see Figure 6) Pre-implementation period: 57 Continuation period: 190 Adjusted rate ratio (95% CI): 1.3 (1.2 to 1.4); p<0.001 **Efficiency** Data at pre-implementation and continuation periods were not reported, but in that period of time, ED BH visits did not significantly change (see Figure 7). Adjusted rate ratio (95% CI): 0.9 (0.8 to 1.1); p=0.46	Patients per PCP, mean Phase 1 (start date: July 2013): 747 Phase 2 (start date: September 2014): 792 Phase 3 (start date: June 2015): 726 Phase 4 (start date: June 2016): 801 Phase 5 (start date: June 2017): 783 Engagement in implementation strategy over observation period, n (%) Practice participation in ≥1 BHLC session: 59 (100%) PCP participation in ≥1 BHLC session: 125 (35%) Physicians earning CME credits by completing attendance, quality project, and survey participation requirements: 97 (27%) Practice use of BHIP and/or MCPAP consultation component: 42 (71%) PCP use of BHIP and/or MCPAP consultation component: 155 (44%) Feasibility (see Table 5) Phase 1 practices surveyed that achieved all incorporation readiness domains (leadership, resources, administrative mechanisms, screening, clinical management, family	NR

Walter, 2021[19] Nonrandomized controlled trial (stepped-wedge trial) **Behavioral health incorporation with learning collaborative** (intervention) vs. **No comparator** to implement SBIRT for behavioral, social, and emotional screening Risk of bias: High (continued)				centeredness, care coordination, and quality improvement): 12 (100%) Phase 1-5 practices that participated in BHIP program components (education, consultation, and integrated practice transformation): 59 (100%) Phase 1-5 PCPs that participated in the didactic learning community sessions: 125 (35%) Phase 1-5 PCPs that used child psychiatry consultation: 155 (44%) Phase 1-5 practices that hired incorporated BHCs: 37 (63%) Provider knowledge/self-efficacy (see Table 5) Phase 1-3 PCPs surveyed who reported BHIP participation had achieved the following: increased their knowledge about symptom rating scales, guided self-management, psychotropic medications, and level-of-care decisions; imparted greater confidence in their ability to manage BH problems; improved the quality of their BH care: 66 (>90%) More than half of practices (63%) ultimately hired an

Study	Implementation Outcomes	Service Outcomes	Patient Outcomes	Other Factors	Subgroups, Effect Modifiers
Walter, 2021[19] Nonrandomized controlled trial (stepped-wedge trial) **Behavioral health incorporation with learning collaborative** (intervention) vs. **No comparator** to implement SBIRT for behavioral, social, and emotional screening Risk of bias: High (continued)				incorporated behavioral health counselor, which was more common among practices with three or more primary care providers (77%) than smaller practices with one to two primary care providers (13%; P<0.001)	

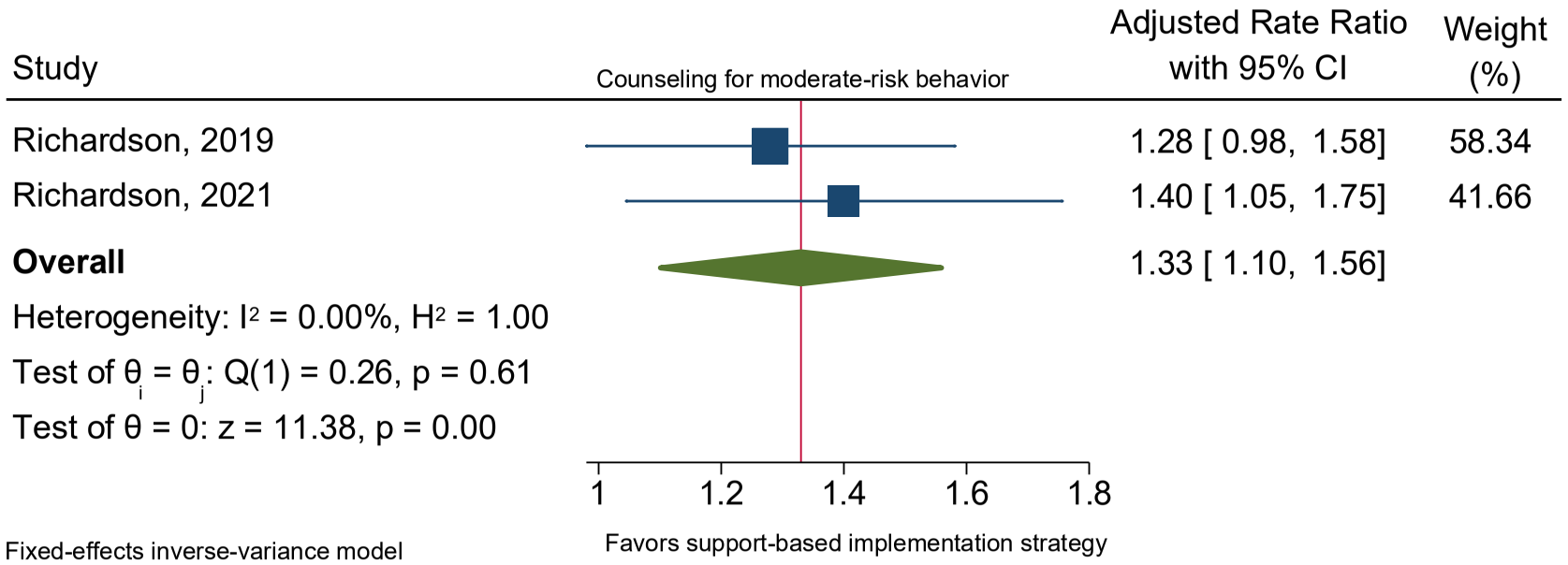
[a] Controlling for age, sex, and clinic as a random effect
ADHD = attention deficit hyperactivity Disorder; BH = behavioral health; BHC = behavioral health clinician; BHIP = behavioral health incorporation program; CI = confidence interval; ED = emergency department; HRA = health risk assessment; MCPAP = Massachusetts Child Psychiatry Access Program; NR = not reported; NP = nurse practitioner; PA = physician assistant; PCP = primary care provider; aRR = adjusted risk ratio; SD = standard deviation; SE = standard error; vs. = versus.

Figure E-1. Meta-analysis comparing the impact of a clinician support strategy with educational materials on risk behavior score at 3 months


Clinician support
Educational materials
Mean Diff.
Weight
Study
N Mean SD N Mean SD
with 95% CI
(%)
Richardson, 2019 147 2.89 2.41 153 3.25 2.37 -0.36 [-0.90, 0.18] 42.97
Richardson, 2021 145 2.68 2.04 155 2.74 2.11 -0.06 [-0.53, 0.41] 57.03
Overall -0.19 [-0.54, 0.17]
Heterogeneity: I^2 = 0.00%, H^2 = 1.00
Test of $\theta_i = \theta_j$: Q(1) = 0.67, p = 0.41
Test of θ = 0: z = -1.04, p = 0.30
-1
-.5
0
.5
Favors clinician support
Favors educational materials
Fixed-effects inverse-variance model

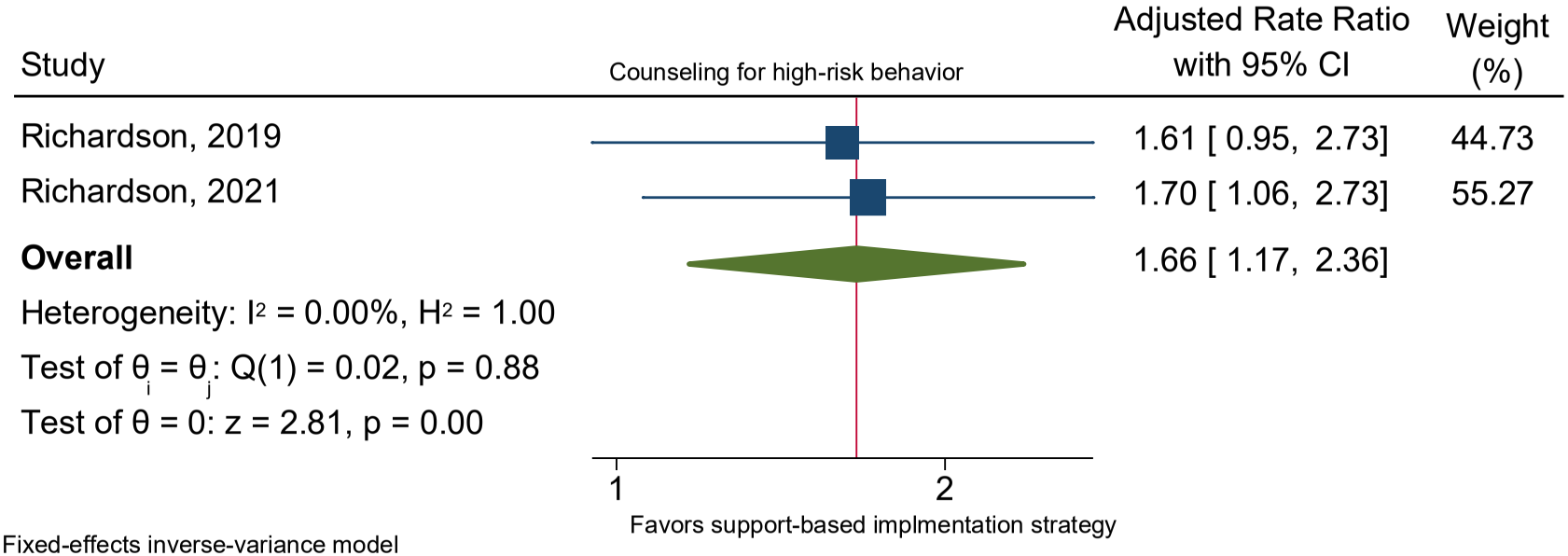
CI = confidence interval; diff = difference; SD = standard deviation.

Figure E-2. Meta-analysis comparing the impact of a clinician support strategy with educational materials on receipt of clinician counseling for moderate risk behaviors



CI = confidence interval

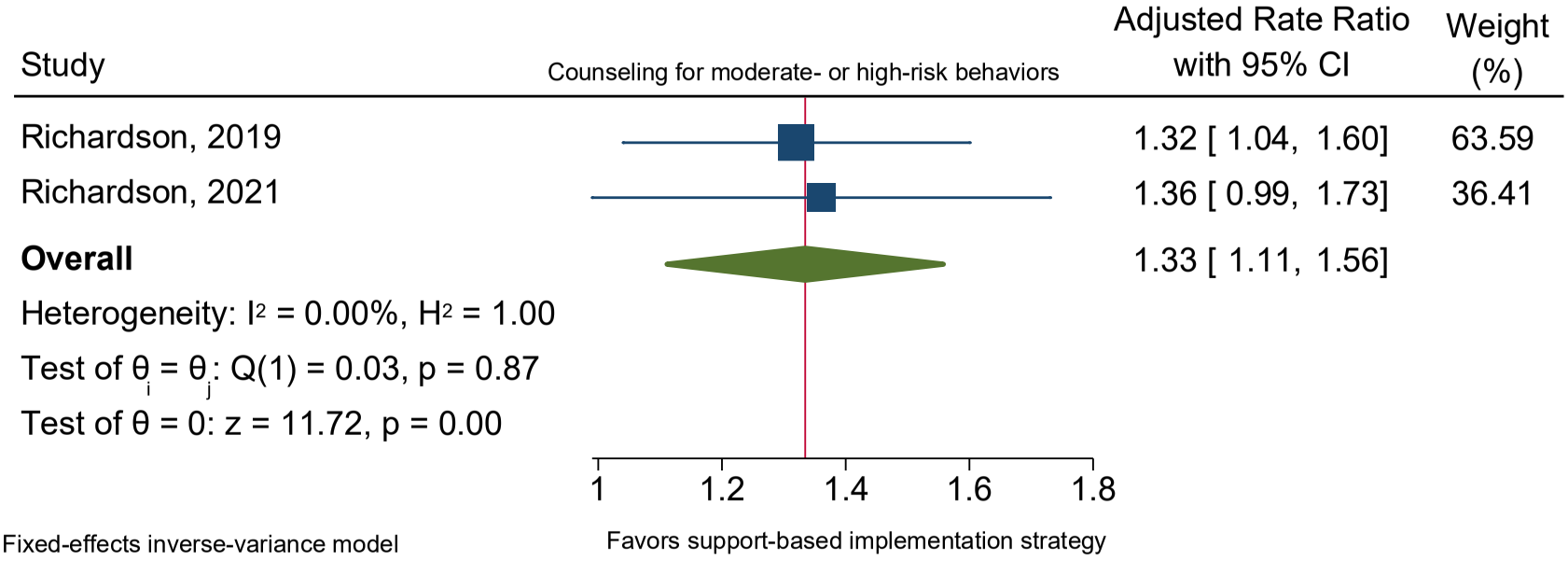
Figure E-3. Meta-analysis comparing the impact of a clinician support strategy with educational materials on receipt of clinician counseling for high risk behaviors



Fixed-effects inverse-variance model

CI = confidence interval

Figure E-4. Meta-analysis comparing the impact of a clinician support strategy with educational materials on receipt of clinician counseling for moderate or high risk behaviors



CI = confidence interval

Appendix F. Accessible Evidence Map

Table F-1. Accessible evidence map

Outcome Category	Outcome	Evidence for **BHI** vs. **Clinician Support** to implement SBIRT for substance use[65]	Evidence for **BHI with learning collaborative** vs. **No strategy** to implement SBIRT for general behavioral health risks[59]	Evidence for **BHI with clinician support** vs. **CS only** to implement SBIRT for substance use[72]	Evidence for **LC** vs. **No strategy** to implement Screening[67] or SBIRT[60] for depression and suicide risk	Evidence for **LC** vs. **Distribute educational materials only** to implement Screening for eating disorders[70]	Evidence for **CS** vs. **No strategy** to implement Screening for depression[58]	Evidence for **CS** vs. **Technology without reminders** to implement SBI for substance use[69]	Evidence for **CS** vs. **No strategy** to implement SBIRT for substance use[72]	Evidence for **CS** vs. **Distribute educational material** only to implement SBI for general behavioral health risks[63, 68]	Evidence for **Technology** vs. **No strategy** to implement Screening for general behavioral health risks[71]
Priority implementation outcomes	Acceptability	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence
	Feasibility	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence
	Reach	Screening[d] ●●●●	Screening[b] ●○○○	Screening[d] ●●●●	Screening[b] ●○○○	Screening[b] ●○○○ Screening in high-risk patients[c] ●○○○	Screening[b] ●○○○	No evidence	No evidence	No evidence	Screening for risky behaviors[b] ●○○○ Screening for mental health concerns[b] ●○○○
	Sustainability	Screening[d] ●●●● Brief advice[d] ●●○○ Brief intervention[e] ●●○○	No evidence	No evidence	Screening[b] ●○○○	Screening[b] ●○○○	No evidence	No evidence	No evidence	No evidence	No evidence
Priority service outcomes	Equity	No evidence	No evidence	No evidence	No evidence	No evidence	Screening of historically marginalized groups[d] ●○○○	No evidence	No evidence	No evidence	No evidence
	Address positive screen	Brief advice[d] ●●○○	Primary care behavioral health visits[b] ●○○○	Brief intervention[b] ●●●○	Initial plan of care[e] ●○○○	No evidence	No evidence	Brief advice[b] ●●●○	Brief intervention[b] ●●●○	Counseling for moderate and high-risk behaviors[b] ●●●●	No evidence

Outcome Category	Outcome	Evidence for **BHI** vs. **Clinician Support** to implement SBIRT for substance use[65]	Evidence for **BHI with learning collaborative** vs. **No strategy** to implement SBIRT for general behavioral health risks[59]	Evidence for **BHI with clinician support** vs. **CS only** to implement SBIRT for substance use[72]	Evidence for **LC** vs. **No strategy** to implement Screening[67] or SBIRT[60] for depression and suicide risk	Evidence for **LC** vs. **Distribute educational materials only** to implement Screening for eating disorders[70]	Evidence for **CS** vs. **No strategy** to implement Screening for depression[58]	Evidence for **CS** vs. **Technology without reminders** to implement SBI for substance use[69]	Evidence for **CS** vs. **No strategy** to implement SBIRT for substance use[72]	Evidence for **CS** vs. **Distribute educational material** only to implement SBI for general behavioral health risks[63, 68]	Evidence for **Technology** vs. **No strategy** to implement Screening for general behavioral health risks[71]
		Brief intervention[e] ●●○○		Referral to specialty treatment[e] ●●○○					Referral to specialty treatment[d] ●●○○		
	Initiation of treatment	No evidence	Psycho-therapy visits[b] ●●○○ Guideline concordant ADHD prescribing[d] ●○○○ Guideline concordant SSRI prescribing[b] ●○○○	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence
Priority patient outcomes	Mental health	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	Alcohol use among high-risk[c] ●●●○ Alcohol use among low risk[d] ●●●○ Heavy episodic drinking among high risk[d] ●●●○ Cannabis use among high risk[b] ●●●○ Cannabis use among low risk[d] ●●●○	No evidence	Risk behavior score at 3 months[d] ●●●● Risk behavior score at 6 months[d] ●●●○	No evidence

Outcome Category	Outcome	Evidence for **BHI** vs. **Clinician Support** to implement SBIRT for substance use[65]	Evidence for **BHI with learning collaborative** vs. **No strategy** to implement SBIRT for general behavioral health risks[59]	Evidence for **BHI with clinician support** vs. **CS only** to implement SBIRT for substance use[72]	Evidence for **LC** vs. **No strategy** to implement Screening[67] or SBIRT[60] for depression and suicide risk	Evidence for **LC** vs. **Distribute educational materials only** to implement Screening for eating disorders[70]	Evidence for **CS** vs. **No strategy** to implement Screening for depression[58]	Evidence for **CS** vs. **Technology without reminders** to implement SBI for substance use[69]	Evidence for **CS** vs. **No strategy** to implement SBIRT for substance use[72]	Evidence for **CS** vs. **Distribute educational material** only to implement SBI for general behavioral health risks[63, 68]	Evidence for **Technology** vs. **No strategy** to implement Screening for general behavioral health risks[71]
	Quality of life	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence
	Adverse events	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence
	Legend:	Favors implementation strategy[b]	Favors implementation strategy but effect does not reach statistical significance[c]	Comparable effectiveness[d]	Favors comparator or no strategy[e]	●○○○ Very low SOE	●●○○ Low SOE	●●●○ Moderate SOE	●●●● High SOE		

[a] All included studies were categorized into one of four overarching implementation approaches: incorporating behavioral health into primary care, engaging learning collaboratives, providing support to clinicians, and using technology to facilitate screening or brief intervention. Studies were classified based on the primary implementation strategy employed, and in instances where multiple implementation approaches occurred, studies were categorized according to the most intensive implementation approach. Behavioral health incorporation was considered the most intensive, followed by learning collaboratives, providing support to clinicians, and finally, the use of technology. For instance, an overarching implementation approach that adds new team members to incorporate behavioral health into primary care approach defaults to behavioral health incorporation over other approaches such as learning collaboratives or the use of technology.

[b] Findings favor the implementation strategy.

[c] Findings favor the implementation strategy but the effect does not reach statistical significance.

[d] Findings demonstrate comparable effectiveness of the implementation strategy and comparator strategy.

[e] Findings favor the comparator or no strategy, that is, greater instances of the outcome in the comparator group. Whether this is desirable or not depends on a practice's intent when incorporating a behavioral health clinician into their practice.

ADHD = attention deficit hyperactivity disorder; BHI = behavioral health incorporation; CS = clinician support; LC = learning collaborative; SBI = screening and brief intervention; SBIRT = screening, brief intervention, and referral to treatment; SOE = strength of evidence; SSRI, selective serotonin reuptake inhibitor

Appendix G. Appendix References

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